The Builder.

Vol. XLI. No. 2112. Saturday, December 17, 1881.

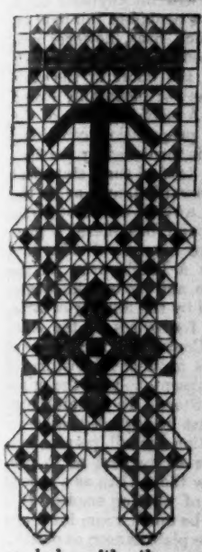
ILLUSTRATIONS.

Canning College, Lucknow (Plan, 765).—Designed by Tika Ram, in the Office of the Engineer-in-Chief, Rajputana State Railway 756
Brighton Street Architecture: Premises at the Corner of West-street and the King's-road.—Messrs. Lainson & Son, Architects 756
Houses at Walmer, Kent (Double-page Engraving).—Mr. James Neale, Architect 760, 761
Bank at Blackpool, Lancashire.—Messrs. Mills & Murgatroyd, Architects 763

CONTENTS.

Further Cogitations at the Smoke Abatement Exhibition 745
The Municipal Government of Paris 746
Land Tenure and Town Buildings 746
Royal Society of Painters in Water-colours 746
Mr. F. Leighton on Art 747
"Barnacles": Architectural Association 750
Fulham Union Infirmary Competition 752
Lettings from Germany 752
Art Students' Home 752
Street Architecture in Sunderland 753
The Fire at the Ring Theatre in Vienna 754
Insurance 754
Redditch and Headless Cross Drainage 754
Brighton Street Architecture: Premises Corner of West-street and the King's-road 754
Houses at Walmer, Kent, for Mr. Alexander Tod 754
Bank at Blackpool, Lancashire 763
Canning College, Lucknow 765
The St. Gothard Tunnel 766
Sanitary and Domestic Exhibition at Brighton 766
The Seed-time of Health 768
Steam Heating for Towns and Villages 769
Baths at Windsor 771
Fall of a Church Bell 771
A New Scaffold Hoist 771
"Developing Southampton" 771
Ancient Surrey 772
The Dumbledykes 772
The New System of Competitions 772
The Nomenclature of Colours 773
Woods 773
The Style for a New Cathedral 773
Emblems of the Trinity 773
Homes of the London Poor 773
Safety from Fire or Panic in Places of Public Assembly 773
Body-snatching 773
Anthracite 773
Corner Buildings and the Line of Front 774
Pumping Water from Adjoining Owner's Premises: Knight v. Mowlem 774
The Monuments in St. Paul's Cathedral 774
Church Building News 776
Dissenting Church Building News 776
Too-attractive Shop Windows 776
Miscellanea 776

Further Cogitations at the Smoke Abatement Exhibition.



THE primary distinction between apparatus for the use of smokeless fuel, and apparatus for the improved combustion of flaming coal, not having been adopted for the classification of the exhibits at South Kensington, or, indeed, for that matter, by the exhibitors themselves, the inquirer has to range over the whole length of the galleries twice, or with a double purpose. The distinction, however, is one of which the importance becomes more obvious at every turn. And while it is to the use of smokeless fuel that we have to look with the greatest confidence for the future, more especially as regards the dynamic production of heat, it is to any practical improvement in the means of burning ordinary bituminous coal that the attention of nine out of ten visitors to the exhibition will in the first place be chiefly turned. But inventors seem to be so generally aware of the probability that the use of anthracite is likely to follow an acquaintance with its advantages, that most of the grates and fireplaces that are constructed with the view of consuming smoke are described as being also adapted, or readily adaptable, for the consumption of non-bituminous coal.

As to this, there is a primary difficulty, the disregard of which has led, and must continue to lead, to failure and loss of time. The quantity of unburned fuel that escapes from the combustion of flaming coal in the form of smoke is, to a very great extent, dependent on the skill and care of the stoker, or lighter and watcher of the fire. Costly and ingenious as are some of the designs for "mechanical stokers," there is no possibility yet shown of superseding the human element. If house fires and furnaces were required to burn on day and night without intermission or alteration of intensity, something might be said, perhaps, in favour of a really automatic supply of fuel. But this condition rarely, if ever, exists. More heat is required at one time than at another. The skill of the fire-maker is always in request, whether he feed and regulate the flame directly, or whether he superintends more or less cumbrous arrangements for the purpose. Thus the prime element of the problem,—the presence of the perfect stoker,—which may be said, in most cases, to afford the practical solution of the difficulty,—is one which no inventor can supply. In very many cases it is little more than loss of time to attempt to do the work of care, skill, judgment, and watchfulness by the substitution of mechanical appliances.

Another difficulty underlies the practical application of the principle which, in one guise or another, makes its appearance in so many of the contrivances which, on the assurance of their inventors, we are invited to accept as preventive of the escape of smoke. This is the conduction of the smoke-laden current that arises from the fire through descending or ascending flues, in such a manner as to pass a second time through the incandescent fuel, or over the flame, in order to consume the carbon driven off as dust,—or, in plain terms,—the smoke. Our recollection of this fallacy extends for a long period of time,—back to the invention of the Arnott stove, and the lecture on the same by the inventor, Dr. Arnott, at the Royal Institution. In many of the stoves or flues that come under this category a very admirable effect might be produced if the current of air would take the exact course shown on the diagrams. But there is, unfortunately, some doubt on this point. When a short cut can be taken by the air, which is almost invariably the case, the elastic fluid may obstinately refuse to take the longer course which presents so many advantages to the consumer. In point of fact, a circulation is assumed, as invariable, which is very rarely found to exist. Different plans for mixing regulated doses of warm air with the fuel in course of combustion will, no doubt, receive due attention in the reports of the executive committee. But in each and all of these cases the services of the competent stoker are usually a *sine qud non*. And then the question arises,—will not the competent stoker produce a good and as thorough a combustion, with as little loss of unburned carbon in the form of smoke, by a simple, well-proportioned furnace and flue, as by the most complicated arrangement of smoke passages?

What may, however, be effected by a branch flue, or double chimney, is very admirably shown by the powerful and beautiful lamps with which, under the title of Regenerative Gasburner, Messrs. Siemens illuminate the conservatory on the Exhibition premises. Here are up-draught and down-draught, perfectly distinct, each performing its proper function, and that with the result of extracting a very considerable part of the theoretic luminous effect of the gas burned. But it must be remembered that the conditions under which this is effected are altogether different from those of the domestic fire. No gradation is required. The lamp may be lighted, or unlighted; but is not required to give varying light. In the stove more heat is required at one time than at another. And further, in the Siemens lamp, the action is at once visible. It is intended to be steady and unchecked, and if any fault should occur, attention would at once be called to it by the failure of light. And this steady, evident action of the apparatus is insured by the use of distilled fuel; that is to say, of gas. In the use of bituminous coal in the ordinary fire the two processes of distillation and combustion are to some extent combined. What the inventor seeks, is so to arrange the order, or the local position, of the two actions, as first to vapourise and then to burn. With every new addition of fuel the action is disturbed and complicated. We do not say that it is impracticable to overcome the difficulty. But we do say that the simplest manner in which it can be overcome is by separating the two processes; and that it would be very difficult to do this more effectually than it is done by the gasworks.

One ingenious method of meeting this difficulty deserves both notice and admiration, although we must wait for practical evidence before we can form a conclusive opinion how far the object has been attained. Previous endeavours have failed. The principle adopted is to feed the fire from below, instead of by putting fuel on the top, the object being to pass the roughly-distilled product of the heated and igniting coal through the clear body of the fire. In the reversible grates, the fire-basket is made into a complete cage, and swings on pivots. Thus there is a door to the cage both above and below. The upper door is opened to put in fresh coal, and then closed, and the position of the basket reversed. The fresh coal is thus put undermost, and the fire burns downwards. The idea is ingenious, and the public will await with interest the report of the committee on the action of the grate. But when we remember the way in which the introduction of what was probably the best lamp invented before the Moderator was absolutely blocked by the impossibility of making the servants who trimmed it reverse it for a few seconds during the operation, we cannot but point out that to expect the ordinary domestic to reverse a grate by the use of a poker as a lever each time that coals are put on, is to be sanguine rather than guided by experience. Another smoke-consuming kitchen-grate is fed at the bottom by a feeder, in the shape of a hoe. It struck us that there was a want of neatness in these underfed fires; and though we are desirous not to anticipate a well-considered verdict, we cannot too strongly point out that the difference between the ease with which an instructed person whose business it is to show an invention, can perform a simple though unusual operation, and the manner in which the same action would be performed by the legion of assistants who come under the orders of housemaid, cook, or groom of the chambers, is likely to be very wide.

Distinct from the endeavour to economise heat by the combustion of smoke and smoke-laden gases, are those inventions that attempt the same object by radiating the greater part of the caloric produced by combustion into a room, instead of sending it up through the chimney. In other words, the close stove in various shapes forms a separate class of exhibits. It is well known that in Austria, Belgium, and other parts

of the Continent great economy of heat is obtained by the use of the close stove. In some of these contrivances a small quantity of fuel is consumed freely for a short time, and the stove is then closed, sufficient heat being produced to radiate through the day, a more or less sluggish combustion being generally maintained. It should be remembered, however, that both the architecture of the houses and the habits of the people where these stoves are commonly used are in accordance with the requirements of the method. The rooms are generally much more lofty than with us, and the effect of a stove-warmed room on a person unaccustomed to its atmosphere is often very painful. We are slow to recommend a substitution of the stove even for the wasteful, but healthy, open fire. Among the stoves which are exhibited, however, it would be difficult to speak in too high terms of the artistic merits of Lönholdt's anthracite stove, from the foundries of Gebr. Buderus, at Hessen, We do not recommend the introduction into a sitting-room of the "Parlour Stove," however applicable it might perhaps be found in a hall, because of the dose of carbonic acid gas which must certainly be evolved by the combustion of the anthracite. But as a handsome piece of furniture especially as to the details of the castings, this stove may be thought to justify the Diploma of Honour awarded to it at the International Exhibition of Patented Articles at Frankfort-on-the-Main.

At the same time, we are far from recommending the use of iron stoves for the dwelling. If stoves are to be employed, there are very strong reasons in favour of the use of earthenware rather than metal for their material. And here, as in so many other appliances for the purposes of domestic health and comfort, Messrs. Doulton, of Lambeth, come to the fore. We are by no means implicit believers in testimonials; but it must be admitted that the testimonials printed in favour of Doulton's radiating tile-stoves are such as to make out a very good *prima-facie* case in their favour in places where a stove is admissible. The advantage claimed for the use of fireclay as the material for a stove is due to the extraordinary facility of this substance for rapidly absorbing heat, and of gradually radiating the same in such a manner as to produce and maintain for a great length of time an equal temperature. A stove burning for twelve hours will continue, Messrs. Doulton say, to warm a room for several hours after the fire is out. These results cannot be obtained with iron stoves, as the metal absorbs the heat so rapidly as to become over-heated, while it allows it to escape too rapidly to maintain an even temperature. The frequent ill-effect of the iron stove, in what is called "burning the air,"—as to the chemistry of which we do not at the moment propose to speak, but as to the ill-effects of which, even in the case of pipes heated by steam, we can speak from painful personal experience,—is absent, the inventors say, from the fireclay stove. We cannot speak from personal experience in England of rooms warmed by clay stoves; but we know quite enough of the difference of behaviour of iron and of fireclay to admit that there is much probability in the statement of Messrs. Doulton. The list of the exhibits of Messrs. Doulton on page 11 of the Descriptive Catalogue refers to an advertisement which we do not find in our copy of the work. The exhibits mentioned are: Portable radiating fire-stoves, with ventilating tile-shaft; down-draught radiating tile-stove, for centre of a room; large tile-stove for public buildings; and fittings and decorations of ornamental Doulton ware for the adornment of open fireplaces.

There are many other contrivances of more or less ingenuity on describing which we feel tempted to linger. But it is our wish to afford to our readers not merely the amusement of a spare half-hour, but advice which they will find it of value to follow. And, therefore, when, by the exertions of a few earnest and thankworthy men, a visible result of the exhortations which have been so frequent, and of such long standing, in our columns, to make a scientific study of the subject of domestic combustion is before us, we hold it better to wait for the outcome of the experiments now in progress, than to give any hasty, and necessarily imperfect, judgment. One thing struck us which should not be overlooked. As far as we can gather, there is no plan proposed for the combustion of bituminous coal, which claims absolutely to prevent smoke *while the fire is being lighted*. But it is precisely at this time that the great production of smoke takes place. Apart from those factory chimneys, the regulations affecting which are enumerated on page 2 of the Catalogue of the Exhibition, the chimneys of every great town are for the most part only intermittent producers of smoke. From a bright, well-made fire, burned under a chimney of adequate height,—for height is the main cause of draught in a chimney,—steady combustion usually allows but little unburnt fuel to escape in visible form. It is when the fire is just lighted, when it is made up, in the case of the kitchen fire, for dinner, or when half a bushel of slack coal is shot into the grate by a slatternly servant, that visible smoke escapes from the chimney. In such a case as the revolving grate, there is a direct effort to meet the difficulty of putting on coal. But the difficulty of lighting is here untouched. And although we are far from saying that there is not a constant hourly contribution to the smoky canopy of London,—as, indeed, out of a million fires, from 700 to 1,000 must be fed every minute of the day, for one time of feeding alone, yet the morning production of the smoke-cloud which first blackens the fog, is the chief cause of the pollution of the London atmosphere. And this morning pollution, as well as the intermitting contributions to it which occur whenever the fire is fed, we have the most serious doubts whether any contrivance will materially diminish, so long as bituminous coal is burned undistilled in our houses.

We trust that the attention of the committee will be distinctly directed to this point. We have no desire to speak dogmatically upon it. But it seems to us that, before endeavouring, at great pains and cost of time, to award the palm among various contrivances for the consumption, or the prevention of the formation of, smoke from bituminous coal, it would be well to allow science to utter a warning voice. If it is possible to say that, "by invention A, or by the better development of invention A, it is practicable so to burn ordinary coal that no smoke will be produced in lighting or in mending the fire by an ordinary servant, or by a person ignorant or careless of the principles of combustion," then a great boon will have been given to the metropolis, and no time or pains should be spared to make the truth universally known. But if it be, on the other hand, the case, that all that can be said is, "By the careful use of invention A, by an educated and skilful person, very little smoke will be produced except just when the fire is being lighted, or roughly mended," it will be well that this also should be distinctly told. For then, it may be added, it is idle to expect much abatement in London smoke except from the compulsory use of smokeless fuel.

Another point deserves careful attention on the part of those who have to present the public with the digested outcome of the examination of the various appliances exhibited at South Kensington. The prevention of smoke, important as that object becomes in the case of crowded cities, is really but a small part of the improvement possible in domestic combustion. The subject of the economic use of heat is one which the present century has seen pass from the dominion of rough practice to that of definite science. It is not so many years since we had any idea of what heat really is. The remarkable phenomenon of latent heat was known to the steam engineer for a long time before he discovered what was either the meaning or the cause of the loss of thermometric elevation, when the invisible energy was doing mechanical work. We think that we can state without fear of contradiction that it is to that Nestor of European engineers and inventors, John Ericssen, K.V., the father of the ironclad monitors, that the world owes the first serious, sustained, and successful attempt to catch,—or as he called it, to regenerate,—the heat which, having done its work, or, at all events, having done work, was on its escape into the free atmosphere. We can personally remember the efforts of Ericssen in this direction as far back as the year 1835. He had at that time constructed a caloric engine of considerable size; and on the principle then first introduced into mechanics, is based that small caloric engine which is at the present moment so great a boon to the man who requires small, manageable, and cheap motive power. We have before now mentioned the splendid work in which, under the modest title of "Contributions to the Centennial Exhibition," Capt. Ericssen has given a brief compendium of the labours and inventions of half a century. His locomotive, the Novelty, it should be remembered, far exceeded any competitor in the trials at Rainhill,—failing to obtain the prize only by accident. We think that the committee would at once render a graceful tribute to one of the pioneers of all, or nearly all, important improvements in combustion, and secure a valuable addition to the outcome of their labours, if they were to invite from this honoured veteran an expression of his opinion on the primary question which we have above indicated. "Is it practicable to burn bituminous coal for ordinary purposes without smoke?" The value of determining this preliminary question would be this, that the whole force of the great army of inventors would be thus guided in that direction in which success is really to be attained. But in the meantime it must be remembered that there are not a few inventions at South Kensington of which the main, and the successfully pursued, object, is the economy of heat. As to this, a special report, or branch of report, should be prepared. Supposing it to be the outcome of the best scientific consideration that the only reliable mode of avoiding smoke is to consume smokeless fuel, the exhibition, however it answers as to smoke, will be anything but a failure, if it affords to the architect full light on those appliances by which heat, however produced, is best to be utilised for domestic comfort.

We are assured that the doors of the exhibition are by no means as yet inexorably closed against fresh exhibits. A second edition of the catalogue is in course of preparation, containing more information than is furnished by the first. In this we shall expect to find some statement as to the prizes to be awarded, and as to the principles on which the awards are to be given. Dr. Siemens, we understand, has offered a prize of 100 guineas. A like amount, divided into two sums, is named as a lady's prize for the best domestic open grate, and the best kitchener. There is a medal offered by the Society of Arts, and 50*l.* is contributed for prizes by the Manchester Association for Controlling the Escape of Noxious Vapours. It is anticipated that one of the Royal family will consent to give the prizes to the successful competitors. In its actual condition the exhibition must be regarded rather as a comprehensive invitation for all persons who have any improvements to suggest as to consumption of fuel to show them, than as a special inquiry into the means of abating smoke. It is obvious that there will be much room for heart-burning if it is not made plain as soon as possible for what prizes are to be offered, and by what means they are to be earned.

THE MUNICIPAL GOVERNMENT OF PARIS.

At a moment when the voice of public opinion is claiming in many quarters what is understood by a reform in the municipal government of London, and when the subject promises shortly to engross the attention of our rulers, it may not, perhaps, be considered inopportune to lay before our readers a sketch of the administrative system by means of which the city of Paris is regulated in a manner which justly excites some admiration. Paris, as the capital of a great country, as a city containing over two millions of inhabitants, and possessing at the same time all that peculiar character which we are accustomed to expect,—and are justified in the present day in expecting,—from a great centre, offers, it will be readily admitted, a model in the simplicity and effectiveness of its organisation. Paris, again, being known to so many Englishmen and Londoners, affords that further advantage that the results obtained by the administrative system in vogue on the banks of the Seine are comparatively familiar to every one who has visited the French capital. Undoubtedly, a central and united administration, such as is urged as necessary for London, exists in full force in Paris. While, at the same time, each individual portion of the capital finds its interests amply attended to by the central administration, the whole capital is benefited by the united action of its self-elected rulers, who take into consideration the innumerable, varied, and necessary questions, the satisfactory arrangement of which constitutes what is understood by a well-organised community.

The contrast afforded between the Paris of to-day and the Paris of thirty or forty years ago, with its narrow, ill-kept, ill-smelling streets,—readers of "Pelham" will recall one of that hero's unhappy accidents in the streets of the Paris of pre-Haussmannic days,—singularly shows what, under a central system of municipal

government, is possible in a modern city. Only, indeed, by a thorough organisation could such results have been attained in Paris, and only, let it be remarked, by the united action of corporation and ratepayers. Paris stands to show us what a great city may be made under a few years of management of intelligent and earnest rulers. There have, it is true, been conditions under which the Paris municipal authorities have been peculiarly assisted in their task. We well remember a late editor of *Punch*,—Shirley Brooks,—on a return from Paris jokingly regretting that London could not be placed for a short time under the control of a despot; but what better or more potent despot should our great city find to work its improvements than its own inhabitants, who, as ratepayers, have it in their power to effect the utmost that a governmental despot has been able to carry out on the banks of the Seine? But can it be justly said that the thorough system by which the huge network of drains in Paris is kept, the water and gas supply ensured, the broad streets watered and swept each day, the houses daily cleared of their dust and refuse, the trees planted, the seats distributed, the "squares" and parks tended and beautified, the statues erected, the police, the fire-brigade, the omnibus and other services of locomotion controlled, &c., can it, we repeat, be justly said that the systematic organisation of all this is the work of despotic influence? To that influence Paris may be said really alone to owe its broad streets and boulevards ruthlessly cut through whole neighbourhoods; the rest is the work, practically, of the ratepayers in the persons of those whom they have elected to represent their interests. Should this be the case, it would go far to prove the truth of the accusation that Londoners do not, as ratepayers, sufficiently interest themselves in parochial affairs; but be this belief unfounded or not, there still remains the want with us of an organised system such as our neighbours have to thank for the comfortable and cleanly management of their model capital.

Foreigners, to use that somewhat vague term in its ordinary and generally-accepted sense, have been always credited by us with a genius for organisation, and, indeed, in comparison with ourselves the reputation is merited; but France, above all other countries, has always received the first place as the home of organisation. Inquiring English travellers are astonished to find the comparative simplicity of the administration by means of which a large country is managed, in a manner so different from our own system. The broad divisions into *départements*, *arrondissements*, *cantons*, and, *communes*, and the various officials, mayors, &c., who regulate the whole, are soon mastered, and for one part of the country it is the same as for every other. Paris, however, let it be remembered, though regarded administratively as a large *commune* or parish, is, from its huge population, submitted to a government slightly differing from that of other towns throughout France. Its administration is practically confided to two magistrates, the Prefect of the Seine and the Prefect of Police, both important political posts nominated by the Government in power. Municipally the Prefect of the Seine is a prefect like the other prefects of the departments of France; but, at the same time, he is Mayor of Paris, not, it is true, like the other mayors, elected to that post, but by the nomination of the *parent* Government. With this difference, important as it is, the prefect-mayor possesses the same powers as an ordinary mayor, it being, however, remembered that the special police measures remain in the hands of the Prefect of Police, who thus takes upon himself, in the limits determined by the law, a certain share of the functions of the mayor of Paris. Paris is, in fact, administered by two mayors, independent of each other in their duties, and their administration is supervised and controlled by a Municipal Council, composed of eighty members elected from each of the eighty "quarters" of the city. The mayors of the twenty "arrondissements" of Paris,—there are four "quartiers" in each,—are in reality only auxiliaries of the central mayoralty, which sits, with the Municipal Council (at present) at the Tuileries, the Hôtel de Ville,—the Mansion House of Paris,—not yet being ready to receive them.* The mayors of the "arrondissements" are local delegates of the mayor of Paris, and were it not for the gratuitous nature of their functions they might be called *employés* of the City Government. Their mayoralties are only branch establishments of the central service, for the convenience of the public; the Municipal Council only having to do with the twenty "arrondissements" of the capital in the voting of their share of the budget, or in the regulation and control of their expenses.*

Since 1871 the Municipal Council of Paris has been elected every three years. Its members, it must be borne in mind, can in no way be considered as administrators; their sole action, indeed, is confined to the power of tightening at need the purse-strings, and in this manner controlling the administration. The relations between the Municipal Council and the central mayoralty entrusted with the government of the city may be said to consist in the following:—The central mayoralty prepares the items of the annual budget, and submits each article to the examination and vote of the Council. In this budget, in addition to the relation of the expense and receipts, there are invariably a certain number of proposals; these are each and all subject to the approval of the Council. All loans, improvements, public works, and such like, can only be proceeded with on an entire agreement between the administration and the Council. On its side, the Council can take the initiative, suggesting to the administration any schemes it may be desirous to see carried out; but in case of non-compliance, the Council have no appeal; the administration and the Council, in fact, reserve each to the other the right of veto, a position which, it is true, occasionally, where mutual concessions are not made, leads to troublesome delay.

For the examination of the budget, the Municipal Council divides its eighty members, as far as possible in accordance with the capacities of each, into seven ordinary commissions, in addition to which there exist seven other special commissions.

The first commission, that appointed to inquire into the *finances*, deals, as may be imagined, entirely with figures; the loans, taxes, rates, *octroi*, or town dues, &c. The second commission is entrusted with the affairs of the central mayoralty (*la mairie centrale*); the *mairies d'arrondissement*; what is understood in France by the *état civil*, comprising the duties assigned in England to the Registrar-General of births, deaths, and marriages; the conduct of what, again, in English we have no adequate expression to explain, the *pompes funèbres* (the duties of the undertaker being entirely monopolised in Paris by this branch of the municipality); the cemeteries, the recruiting of the army, the general management of the church in its varied relations to the corporation. This commission takes upon itself, in addition to these duties, the examination of the municipal libraries, the archives, and the municipal museum now installed at the Hôtel Carnavalet, answering, to a certain extent, to our Guildhall Library.

The third commission,—the *Commission de la voirie de Paris*,† as it is termed,—studies by the reports made to it by the administration, the plans of all proposed new thoroughfares, and the public roads generally, the naming of the streets,—managed in Paris with a consideration, alas! unknown to Londoners,—the paving, sweeping, lighting, and maintenance of the roads. All questions of indemnity for damages are submitted to this commission which likewise has to deal with the omnibus, tramway, and cab traffic of the capital, in its relations with the Corporation.

The fourth commission is entrusted with the "public instruction" and the organisation of charity (*assistance publique*), the communal or parish schools, with instruction in drawing and singing, apprentices' certificates, bursaries in the "lycées" and colleges. Here, again, it may be remarked that the whole scholastic system throughout France is based on an organisation such as we may well envy our neighbours. In the matter of charity organisation this commission has, it may be imagined, a wide field for its labours; among its numerous duties may be mentioned that of an inspection and control,—in its relations with the charity budget,—of the Mont de Piété, the Government in France, as in Italy and Belgium, being the public pawnbroker, the Mont de Piété being one more of those admirable and charitable institutions, the want of which with us and in America has often been regretted. It may be mentioned that this fourth commission has recently named two special commissioners, one entrusted with the preparation and establishment of new scholastic institutions, the other to study the important question of technical instruction.

The fifth commission is called upon to consider the architectural and other artistic adornments of the capital. The squares, parks, walks, plantations, the Bois de Boulogne and Vincennes, the renting of those numerous little establishments, kiosks for the sale of journals, &c., that form so characteristic a feature in Parisian street life, the *urinoirs*,—a point admirably considered on the banks of the Seine, where lately have been erected an even greater convenience to the public, and known as *châlets de nécessité*, a hundred of which, architectural features with their polished marble exteriors, have been scattered over the capital. To these duties we must add the commission's consideration of all public notices, and play-bills, these latter not allowed, as with us, to cover every vacant hoarding, but neatly posted every morning by a body of special *employés*, on to a number of "columns" as they are called, placed in every thoroughfare for the purpose. Under the consideration of this commission come also the several municipal theatres, and the very important annual item of "encouragement" (by commissions and purchase) "of the fine arts." The management of all public fêtes and ceremonies rests also with this commission, but since the last Great Exhibition a special *commission des fêtes* has been appointed.

The sixth commission, of "drains and water," examines all the various and complicated details of these two most important factors in modern existence; the commission has constantly under examination the water supply from its various sources, as also the navigation, maintenance, and improvement of the canals belonging to the City.

The seventh commission is entrusted with all questions relative to what is understood by the "Domaine de la Ville," the bonded warehouses, the markets, the *abattoirs*, or slaughter-houses, weights and measures, legal difficulties, &c. In addition, the commission has to examine the budget of the Prefect of Police, the pensions to retired *employés*, policemen, and firemen. There remain to mention three special commissions, one entrusted with the organisation of the labours of the Municipal Council; the second examines the important question of unhealthy dwellings; the third has been nominated to examine and report on the annual budget. These special commissions are all temporary, while the ordinary commissions may be said to be permanent.*

Such, roughly stated, is the system of organisation by means of which Paris is ruled, and, let it be remarked, without complaint on the part of the public; ratepayers exercise, indeed, their right to grumble at the expenses laid upon them, but the system enables a strict watch to be placed on the employment of all sums, and every Parisian knows that without expenditure little can be expected, as the American proverb, recently quoted in these pages, has it, "Nothing for nothing, and very little for a dollar." It is not in Paris as it is in New York, governed also by a central municipality; the accounts of the wholesale peculation on the part of the rulers of the "Empire City," which from time to time have reached Europe, must not be dwelt upon ill-naturedly; New York must still be regarded as an experiment,—an experiment, however, the success of which who can deny? The circumstances of the extraordinary growth of the city in a new country must be taken into account. In this matter of misappropriation or misuse of municipal funds it will not be found, we suspect, that a central form of government affords more, rather less, facilities than any other system of city rule. In the case of the municipality of Paris it can, we believe, be shown that enormous as is the annual budget of the French capital,

* When the Hôtel de Ville was burnt by the Communists, the Prefect and his staff moved into the Palace of the Luxembourg; but when the Government was transferred from Versailles to Paris, the Senate requiring the Luxembourg, the Prefect again crossed the Seine to his present quarters in the Tuileries.

* In the preparation of this paper we owe much of our information to the excellent little rate-payers' manual, "Paris Municipal," by M. Lenereux, (Paris, 1879).

† The word *voirie* in French administrative language has two acceptations. In the first it comprises everything relating to the public way (*voie*) and the buildings erected on it. The second is applied alone to those establishments to which is carried, and where is manipulated, the sewage of the capital.

* The Municipal Council also, excepting certain vacations, corresponding to those of the law courts, is permanent; the second Municipal Council (after the existing Government was formed in 1871), elected at the end of 1874, renewed in 1879, held in the three years 257 meetings, its commissions no less than 926. During this time it deliberated on no less than 9,143 affairs.

far exceeding eight millions sterling to two millions of inhabitants, in no modern city are the contributions of the ratepayers so skilfully laid out with a view to that important commercial consideration of a proper return for the outlay.

Having thus sketched the outline of the Paris municipal system, we may find occasion at some future time to deal more specially with the items and management of the expenditure of the annual budget.

LAND TENURE AND TOWN BUILDINGS.

There can be no question at all that the subject of the tenure of the land in England is rapidly becoming the burning question of the day. Much as we hear about the matter of compensation to agricultural tenants for improvements and other things very closely connected with the agricultural interest, yet no person who discusses the subject of agricultural distress in all its bearings fails to touch upon the question of the tenure of English land. More works than one of considerable merit which have recently appeared in the publishers' lists, have dealt wholly with the subject of the reform of tenure of English land, notably Mr. Brodrick's "English Land and English Landlords," a work which is of the utmost value at the present day. But the question is one which has as much interest for dwellers in towns as for those in the country, and architects and builders may fairly claim to be very interested parties. We can scarcely suppose that any one who will regard the subject of land tenure in England candidly and calmly, and without letting political feelings get the better of him, can hesitate in desiring to see the tenure of land made as free as possible. By free land we mean property which the owner can dispose of how and when he likes. At the present time, very large portions,—indeed, the larger proportion,—of our houses belong to a few families, and are in strict settlement. It is quite true that building leases have been granted to builders and others, who again have leased the houses which they have erected, but the freehold houses in our towns are few compared to the great mass of leasehold houses. Now, we may say at once that assuming settlements and the tieing up of land put an end to, it would be Quixotic to suppose that all the leasehold tenants of towns would suddenly become freeholders. There can be no question, on the other hand, that freedom of land would gradually tend to cause the spread of our houses among many owners, and would prevent the great mass of leasehold premises from springing up, which are a consequence of the present system. Into the moral, social, and political merits of the existing system of life tenancies and changes which characterises our land system we do not propose now to enter. Those who desire to see the *pros* and *cons*, will find them discussed in the work of the Warden of Merton College, to which we have referred in Mr. Kay's "Free Trade in Land," Mr. Kinnear's "Principles of Property in Land," an article in the current number of the *British Quarterly Review* on the "Tenure and Transfer of Land," and in various other books and journals.

Let us consider, however, how our towns are affected by the absence of freedom in our land tenure, and would be likely to be by a reform of the existing system. Every Englishman's house is said to be his castle, and that saying means more than most people think. A man who owns a thing absolutely will spend more money on it than he will if he is only a temporary possessor. In these days he has not to fortify it against outward human enemies, but against the invisible foes whom sanitary reformers have long been fighting. We do not for a moment doubt that if the occupiers of town houses were also the absolute owners, the cause of sanitary science would advance at double its present rate. If a person knows that he can be sure of being in the same house forty years hence, or that his representatives will be, or that he or his representatives will be receiving rent in respect of it, he will not hesitate to improve it. Mere seven, fourteen, or twenty years' leases are not enough, for town tenants do not, like agricultural tenants, reap the fruit of their improvements in hard cash; they do so in increased comforts, in greater security against disease, in mental satisfaction at perceiving more graceful shapes or colours. The agricultural tenant who at the end of a twenty-one years' lease, in consequence of having drained fifty acres, has received largely increased crops, has paid back the capital, and received a handsome interest on it, is fully recompensed. But the man who has had his house well ventilated, and raised it an extra story, at the end of twenty-one years has by no means reaped the full fruits of his outlay. Therefore, it is pretty evident that if freehold tenures were more common in our towns, the sanitary and the ornamental character of our houses would increase with much greater rapidity than at present. We will give an example of the way in which the system of leases acts to the detriment of the beauty of our houses. The whole of the east side of Cadogan-place belongs to Lord Cadogan as ground landlord. Fresh leases are, we believe, granted on condition that the tenants spend a certain sum on their houses, and, among other things, raise them one story, and hide the honest red brick by a ghastly winding-sheet of stucco, and place on the top a heavy balustrade. Now harmony is one thing, but monotony is another, and by the time the whole of the east side of Cadogan-place becomes of the same character, it will show to the stranger a long line of dreadful and monotonous ugliness. But, if many of these houses belonged absolutely to their owners, can any one doubt that we should see houses worthy the situation? In that long line of habitations there is not one in which, externally at any rate, the skill of the architect is expended; but, given an absolute owner, he would undoubtedly call in the services of an architect to improve and enlarge his dwelling. We give an instance such as this because it is what may be called practical in its character, and nothing is so telling to an English mind as a hard fact. And the matter may be put in another form, by asking the question, can freedom of ownership deteriorate the aspect of our towns? Any one of observation and experience will answer at once that it cannot, and therefore it must, whatever effect it may produce, work for good. Consequently we think there can be no doubt that, were freedom of ownership to become more common, houses would be much more largely occupied and owned by the same person, and would consequently be more substantially built, would be the subject of many more improvements, and would be more pleasing to a cultivated eye and taste, and consequently that the reform of our land system will tend to make our houses more healthy and more beautiful.

It is sometimes said that if land becomes so easily saleable, rich people will buy it. But even if a rich man does buy a number of houses, he cannot live for ever, and it is quite certain that in time the property will, partially or wholly, come into the market again. But we do not believe that the millionaire will amass property in the towns to any large extent when, as we hope, freedom of ownership shall be the characteristic of our land tenure. A man will only be too glad to invest his money in his habitation if he can sell it when he wishes or leave it to his children, and experience shows that the probabilities are in favour of occupiers purchasing their habitations, and so by degrees we should find our towns owned by a number of persons absolutely, and not occupied by tenants whose great aim and object is to spend as little on their houses as is consistent with comfort and average healthfulness. Consequently, also, freedom of ownership in our towns appears likely to be an incentive to thrift since many a man will try to save money in order that his house may become really his castle. We observed before that the mind of the architect is not visible in the present "monotonizing," if we may coin a word, of Cadogan-place; and this leads us to point out that freedom of ownership by enabling and inducing owners to improve their houses or to build them for themselves would improve the architectural profession throughout England. It would improve business and give greater scope for individuality and taste because at the present day in our towns the architect, considering the number of houses, has comparatively little work. If a nobleman, or a rich merchant, wishes to build a palatial mansion he calls in an architect, but, given an ordinary row of medium-sized houses, the builder takes care to dispense if possible with the services of an architect. Moreover, freedom of ownership would give more employment to builders and scope to a good class of work, the order would not be for "something that will last out my lease," or "just do for my time," but something that will last long and well. Regarding, therefore, all the interests which are connected with our towns, their healthiness and their beauty, the thriftiness and comfort of their inhabitants, a reform of our land system promises beneficially to effect all and each of these. There is nothing to be said in favour of the great London estates of the Grosvenors, Bedfords, and others. All those, therefore, who dwell in our large towns, who earn their livelihood in them, whether as architects or builders, should do what they can to bring about greater freedom of ownership in this country, irrespective of political opinions.

ROYAL SOCIETY OF PAINTERS IN WATER-COLOURS.

The Winter Exhibition of this Society, which opened last week, may be fairly called a remarkable one, when we consider that the exhibition held at this season does not profess to be the principal one of the year. Although some of the greatest names in English water-colour art, which now belong to the past, remain still unsurpassed, and perhaps in some qualities unequalled, there has probably been no period in which such an amount of really fine work, so varied in character and interest, could be got together in a single winter exhibition of "sketches and studies," and the favourable impression which a first view of the present exhibition suggested to us, is only increased by more detailed examination.

Looking first at some of the figure subjects, which are, as usual, the least numerous class, we may direct attention to Mr. Walter Duncan's fine work, rather a finished drawing than a study, representing "Imogen before the Cave of Belarius" (136). We recognised in this painter's earlier exhibits, some seasons back, the evidence of unusual power and expression in dealing with ideal figure subjects. In some more recent exhibitions we have been disappointed in not finding in his works all that he had led us to expect; but the "Imogen," which is his principal contribution this year, is more equal to what we have previously seen from his hand. Combined with very fine drawing and colour there is the higher power of intellectually realising the subject; and after all the pretty and characterless Imogens one has found in exhibitions, it is a relief to see a figure which really seems to embody the poet's idea of the person and the situation. Doubt and hesitation are expressed in the whole attitude of the figure, in the expression of the somewhat care-worn, though beautiful face, and the nerveless grasp of the hand on the unaccustomed weapon. The painter has not forgotten that Imogen, though a lovely and delicately-nurtured princess, is here in the position of one who has undergone much mental agony and bodily fatigue and exposure, and he tells this story plainly in her countenance. We may contrast the work in some senses with Mr. Tadema's "Pandora" (334), a half-length of a red-haired Roman girl, of the type which he has often repeated, who holds a bronze casket. Here the interest is in the rich and delicate colouring of the figure and the accessories, and the completely antique feeling of the whole. The drawing appears to us curiously defective for so masterly a painter. The line of the back is stiff and straight, and the forearm seems out of proportion with the upper part of the limb. The intellectual interest of the figure is *nil*. To call it "Pandora" is an absurd reduction of a great poetic legend to the plainest prose.

Among other figure subjects Mr. H. Wallis sends a very interesting series in which he has turned his studies of the topography and architecture of Venice, and of ancient Venetian costume, to account in a variety of scenes illustrative of the "Merchant of Venice." We have "Portia and Nerissa at Belmont" (69), seated in a richly-marbled interior hearing the message of the "fore-spurrer" who comes before his lord; Portia is one of the Venetian blonde women so well known to us on the canvases of Titian and Bordone, Nerissa a dark girl of evidently inferior social standing; but in this case the character of the figures is not much made out, it is rather a sketch of interior effect. "Shylock, Jessica, and Launcelot" (111) is more distinctly characteristic; the idea of Jessica is very good, she is a pretty little doll of a girl with plenty of mischief in her; she appears again, perhaps to better advantage, in "Jessica and Launcelot" (156), where she has just received the letter from Master Launcelot

The latter is in both scenes a little too respectable-looking and deficient in the comic element. A monochrome study, "Antonio, Bassanio, Gratiano, and Lorenzo" (125), where the two latter are taking their leave (in the first scene), is an admirable realisation of the scene, and of the contrast between the volatile young gentlemen who are making their bow, and the staid and dignified Antonio. "Bassanio unfolding his Plans to Antonio" (235), also a monochrome, is very good. In "Portia and Nerissa on the Morning of the Trial" (11), the interest is again rather in the scene, the representation of the gondola and the gondoliers of the period, than in the character of the figures; the artist seems to have been rather afraid of Portia and Nerissa, and has evaded any very precise delineation of their characters. But there is matter enough in these studies for two or three capital pictures from that perennially interesting and charming drama, some of which we hope will be forthcoming before long. Mr. Wallis seems to be making the subject his own.

Mrs. Allingham continues to exhibit in her various cottage children the power she has of giving interest and beauty to simple figures from English rural life, without imparting to them any character inconsistent with simple and unpretentious every-day life. The "noble peasant" who has been thrust upon us rather pertinaciously by one or two contemporary painters (following the lead of Frederick Walker) has no place in Mrs. Allingham's scenes. We have that sweetness of expression which is really to be found in good specimens of English cottage girls and cottage children, but nothing is exaggerated. The face of the child at "Granny's Gate" (325), and that of the girl "Knitting" (345), are charming specimens of natural unconscious sweetness of expression. "Washing" (370) represents a more matured figure, equally natural. One of the most charming of this lady's works this year is one in which the figures are subordinate, "Cottage at Grayswood" (314), a country lane scene before the gate of a cottage which is nearly buried in a mass of summer foliage, from amid which tall sunflowers glitter; the finish of every detail on so small a scale, down to the cat playing before the gate, is as complete as the total effect. Mrs. Angell, another lady member who reflects the highest credit on the Society, is as perfect as ever in her studies of flowers and birds: in the drawing of two "Foreign Birds" (320) we can fancy that we could lift the feathers with our fingers. Among the lady's several flower-paintings it would be difficult to say that any one is better than the others.

Among the landscapes there are a large number of beautiful drawings and sketches. Mr. Alfred Hunt contributes only one, unfortunately, a rich misty evening view of Durham, remarkable even among Mr. Hunt's works for the manner in which the uncertainty of form and outline produced by mist is given, combined with real certainty and careful indication of all the points of the landscape. Mr. Hunt's misty pictures are almost like nature in this way; as you look into them forms come out through the mist which are not noticeable at first glance. Whether the prevalent tone of warm brown is not a little more like a painter's effect than an effect of nature may be open to question, but this, like so many others of Mr. Hunt's works, has the effect of making us forget that we are looking only at pigments on a flat surface to an extent which few other landscape-painters achieve. In this respect another work in the room is rather remarkable, Mr. J. W. North's "Season of Mist and Mellow Fruitfulness" (31), an autumn landscape with an intertangled foreground of foliage. We have before expressed a doubt whether this gifted artist was not in danger of over-working a receipt for effect which he has invented for himself, and the present work is open to the charge of mannerism, when compared with what has preceded it; but a drawing more full of the real glitter of light, and in which we are more able to forget paint, it would perhaps be difficult to find; it is certainly a brilliant effort. An increased power in the realisation of brilliant and glowing effects of light on foliage seems to have been attained by an old and valued member, Mr. Naftel, whose previously rather quiet and even prosaic drawings are replaced this winter by some studies in which very brilliant and beautiful effects are realised, and a peculiarly delicate harmonious tone pervades the whole. Among these "Bettws-y-Coed Village" (205) and "Golden Leaves" (250) are particularly excellent. The new member, Mr. Wilmot Pilsbury, gives indications that his line of work is less restricted than his first set of exhibits led one to suppose. In his "Worcestershire Hop-pickers" (177) the interest is chiefly in the figures, which, though a little deficient in variety of character and expression, are thoroughly well executed, and lead us to suppose that we may look for good work in subjects of this class from their author. In his landscape, "Wheatfield" (91) Mr. Pilsbury's work still strikes us as deficient in breadth and atmospheric effect; in a smaller drawing, "Corner of a Farmyard" (210) there is some fine work, though this would hardly have been done unless Mr. Boyce had shown the way first. Mr. Albert Goodwin contributes, among other things, two works of rather peculiar *motif*; one of these, "The Invincible Armada" (123), represents the decaying timbers and skeletons of sundry ships left bare on a shoal, and showing dark against a stormy, dull red twilight; it is a work of considerable poetic feeling. "Waiting for the Express to pass" (55) is a powerful sketch of a night effect at a roadside railway station, a waiting train filling the air with smoke and steam, the scene being only fitfully illuminated by the porter's lamp and the lights in the carriages.

Among larger works, Mr. Basil Bradley's "Getting in the Barley—a Coming Storm" (96) conveys finely the idea of the moment when the first premonitory gusts in advance of a thunderstorm are felt, and the figures of men, women, and horses are effectively grouped. The same artist, in "A Study in Rotten Row" (240) has attempted to repeat his splendid success of last exhibition in drawing a lady on horseback, not quite so successfully, though the figure is a very spirited one: the horse seems a little long in the loins. Mr. Clarence Whaite's large work, "The Harvest Moon" (68) is unquestionably powerful, but it is not nature; and perhaps the latter criticism might apply equally to Miss Montalba's large drawing, "Coming into Port, a Sirocco Day, Venice" (227), in which, in the endeavour after the silvery effect which this artist is so fond of, the colour is so faint and so capriciously concentrated on certain parts of the craft only, that it is almost difficult to say at first sight whether it is meant for a coloured picture or a monochrome study. Among the landscapes which are pure and unaffected transcripts of nature, two by Mr. Cuthbert Rigby should be noticed, "The Old Furnace" (294), and "Evening" (208); both represent the character of some special locality where low, heavy, stone-built cottages are planted among somewhat barren hills; in feeling and in realising a special character in landscape they seem perfect. Mr. J. Parker's various little studies of bits of French coast towns are excellent specimens of street architecture sketches, especially "La Lieutenance, Honfleur" (36); and architectural interest of another kind is shown in Mr. G. Andrews's drawing of the Girgenti Temples (17), and in Mr. Carl Haag's general view of "Baalbeck" (164). Mr. Herbert Marshall has made a fine study of "Rotherhithe" (26), and Mr. Otto Weber one of "Greenhithe" (207), with his favourite cattle reposing on the marshy ground adjoining the river; Mr. Marshall's "Durham" (251) should also be looked at,—an interesting contrast to Mr. Hunt's before named.

Among miscellaneous subjects may be mentioned a study, apparently for fresco decoration, by Mr. Marks, entitled "Welcome! the Arrival of the Guests" (200), a good specimen of this artist's peculiar humour in the adaptation of old-world figures to modern subjects: the same artist contributes some characteristic studies of heads (266, 274) representing various types in modern life. Mr. J. D. Watson exhibits two figures under the title of "A Warm Reception" (231), which are very clever, and analogous in humour to Mr. Marks's productions; and there is a fine figure quite in Mr. Watson's own style under the title of "The Student" (315). Mr. E. Buckman's "Cobwebs" (326), an interior of a hayloft with a figure reading by the light of a much-cobwebbed window, should be looked at; it is a very original thing. Mr. A. H. Marsh sends two figure-studies, one of which, "Driftwood" (128), is very pathetic, and has the materials of a fine work in it. Mr. Brittan Willis's "Slight Study from Nature" (115) and "Highland Cattle" (395) are very good specimens of cattle studies; nor must we forget Mr. F. Tayler's "Waiting for the Hounds" (27), which contains as good a study of a horse as one could wish to see. Our list by no means exhausts the good points of this admirable exhibition.

SIR F. LEIGHTON ON ART.

THE President of the Royal Academy, in his address last Saturday, on the occasion of delivering the prizes to the successful students of the year, took opportunity to deal with one of the most important considerations which can be entered into in reference to the objects of art and the conditions under which artistic work is to be carried out. What, he proposed as his theme, is the relation of art to morals and religion? It is only in a period when art is not exercising her highest activity, when she is somewhat fettered in her powers and doubtful in her aims, that such a question would be raised at all, and the fact that the President of the leading body of artists brought it prominently forward and devoted so much time to its consideration on such an occasion, must, we fear, be regarded as in one sense a proof that art is hardly in so healthy a condition at present as Sir F. Leighton evidently wished his hearers to infer that it was. In great periods of artistic production, whether in sculpture or painting or music, the great question is how best to master the difficulties of the art and evolve the most complete productions possible. It is not then the question, to what end do we do this or that in art, but how can we do it best? and the mere achievement is an end in itself. It is, however, of no use to ignore the fact that we are at present in the midst of many "obstinate questionings" about art; no one who takes the wide view of the subject in relation to contemporary thought and manners which Sir F Leighton might be expected to take, can ignore their existence; and he may have done good service to some hesitating minds by his review of the position, and the tolerably decisive answers which he gave to some of the heresies, as we may call them, of the day in reference to the *raison d'être* of art.

In regard to what may be termed the religious view of art, every one must be aware that this has been very strongly urged of late years, though we should divide the art-religionists into two types, which Sir. F. Leighton did not distinguish, but which we think are strongly marked. The one is the church party, represented mainly by some enthusiastic amateurs, who proclaim art to be *ancilla Domini*, the "handmaid of the Lord," and regard the furnishing of ecclesiastical decoration and ecclesiastical paintings as the chief and most noble end of art. The other is the much larger class, of whom Mr. Ruskin and some of the once so-called pre-Raffaellite brethren are the most prominent leaders, who are not specially ecclesiastical in their leanings, but who very decidedly proclaim that the end of art is to inculcate moral truths, and that without that end it is but elaborate trifling. Sir F. Leighton, in alluding to the lengths to which this moral and religious, or we might even say ascetic, view of art, had been carried, mentioned that he had met with the idea, among some of the German painters, that even a love of rich colour was a sensuous and to some extent immoral indulgence of the lower part of the artist nature, arguing a depraved taste. It is a curious contrast that in England, so far from our having adopted any such extreme view as this, the love of rich colour has usually been very predominant in the theory and practice of the "moral" school of artists in this country. But the idea that art must have a moral end is nevertheless very strongly urged by certain of our artists, and with the more effect that it falls in precisely with some of the predominating traits of English character, especially English middle-class character. The sensitiveness to beauty for its own sake is not prominent in the English national character. The idea of moral duty and responsibility is, on the other hand, very strong in our national character, with which therefore the moral theory of art precisely falls in. A large proportion of English people would entirely sympathise with an artist who should proclaim that his works were all produced with a distinctly moral aim, although such a proclamation would in reality be no more reasonable or valuable than Artemus Ward's advertisement of his "highly moral waxworks."

The arguments brought forward in favour of this view of art as a moral agent are of two different kinds. The one involves the assertion that, as a matter of historical fact, art has been

greatest when pervaded mainly by a religious motive. The answer to this is simply, we do not see or feel this alleged superiority, and the world at large has decided in the same sense. Sir F. Leighton brought forward, as a kind of *reductio ad absurdum* of this part of the moral argument, the example of the Spanish school of painting which flourished under the most direct influence of the ecclesiastical idea, the school of which Morales and Luis de Vargas are examples, and asked who would claim for these men, valuable as in some sense they were, a place alongside Velasquez, "the most mundane of painters, and Shaksperian almost in the width of his mental objectivity"? The argument drawn from the growth of painting in Italy he admitted to be "more specious," and in reference to it the President drew attention again to the precise nature of the position taken up by the moral and religious school, the promulgators of the "didactic theory": "it is, that the moral edification of man being the highest duty of art, those productions of art will take the highest rank which teach, with sincerity and of a definite purpose, the greatest number of moral truths, and that the painter who (the artistic gift being, of course, postulated) aims most constantly at the promulgation of these truths will produce the greatest works. You will at once feel that these assumptions, if accepted without reservation, sap at the roots of all free criticism, practically substituting for it a foregone conclusion. A critic who approaches a work of art under their influence will instinctively gauge it in accordance with them. . . . . Now if, on a review of Italian art from its rise to its zenith, we ask ourselves which works have by the consent of the vast majority of the intelligent been pronounced the most mature and perfect, we shall not find that verdict harmonising with one which should be built up on the axioms of the didactic theory; we shall, on the contrary, find that the evolution of art in Italy, an evolution singularly organic and continuous, bears no ratio, unless it be an inverse ratio, to the religious life and development amid which it ran its course." It is useless for moral enthusiasts in favour of the religious view of art to protest the contrary, to say that they find more true greatness in the art of Cimabüé than in that of Titian, for the verdict of the vast majority of educated minds has fully decided to the contrary, and in such controversies, which admit not of mathematical argument, *Vox populi vox Dei*, though in a rather different sense to that in which the proverb is generally used, is the ultimate test. The progress from the phase when Italian painting was under the dominion of the ecclesiastical idea to that of its fuller and freer life, is very well indicated in Browning's famous poem, "Fra Filippo Lippi," where the clever but scapegrace painter tells his audience how the monks were scandalised at his painting men and women just as he saw them, instead of painting things to edification. The whole poem makes a very good commentary on some portions of Sir F. Leighton's address.

But apart from the historical aspect of the matter, it is perfectly true, as Sir F. Leighton observed, that this idea of a high moral and didactic end in art appeals with great force to many serious and earnest minds. He made a very good reply to that view of the subject in reminding his hearers that one effect of the adoption of such a view of art must be to remove from among the category of the arts one of the most beautiful, that of music. Scarcely any one has ever pretended that music can in any manner represent moral ideas, and it would certainly be difficult to see how an argument which would shut the mouth of one art altogether can be logically applied to another. The answer is, not that ethical truths and ethical teaching are of inferior importance to art, but simply that art is not the medium for the advocacy of ethical truths. The President pointed out (and in these pre-eminently scientific days the illustration is especially effective) that precisely the same limitation applied to science; that science is not concerned with reading moral and religious lessons, but simply with investigating nature. That moral deduction may be drawn from or suggested by great scientific discoveries may be true, but it is not the business of the man of science to draw them; it is his business only to find out and promulgate scientific truth. In like manner, the artist who makes it his end to promulgate ethical truth is employing a very roundabout means to that end,—speech or writing would answer the purpose much more directly; and he is at the same time liable to fall short in what is the legitimate province of art, the promotion of intellectual enjoyment.

There is, however, we may be allowed to add, one sense in which an artist may be said to exercise indirectly a moral influence through his art, and that in a sense quite in keeping with the application of his mind to the legitimate objects of art. What we mean to imply is this, that in proportion as the artist gives his best and most strenuous endeavours to the perfecting of his art, and gives evidence in all his work of serious thought and study, in so far will his works, in addition to the pleasure which they afford, exercise a healthy and bracing influence on the minds of those who contemplate them,—an influence which at least predisposes the mind to moral energy and effort: while a slackly and carelessly studied art, however "religious" the subjects may be with which it deals, has an enervating effect on other minds. It would not be difficult to call to mind instances of this not far from home: examples of great "religious" paintings which the public are exhorted to go and see for the quickening of their religious sympathies, and which represent false, hasty, flashy, and therefore, in a sense, immoral art, produced hastily to win a cheap applause. All such art has its bad effect in the long run, just as all art which bears the stamp of serious artistic purpose and endeavour after the best that can be done, carries a moral with it, though not in the same sense that the didactic school of critics mean by moral teaching. This point might have been a little more brought out in the President's address, which, nevertheless, was an excellent contribution to the consideration of the important subject with which it dealt.

"BARNACLES."

This was the title of a paper read before the Architectural Association on the 9th inst. by Mr. Cole A. Adams. After some introductory remarks, in which the various meanings of the words "barnacle" and "barnacles" were quoted, the author proceeded to speak of the "barnacle" as a shell-fish, observing that no matter what subject the "barnacle" attacked, he invariably "went to the bottom of it," with a persistency and method which were very highly to be commended to, among other people, architectural students, whom he advised to cultivate the habit of mastering one subject of their studies at a time, as the pursuit of such a course would give a breadth and power to the mind. The difficulties which beset the modern architect who aspired to hold a high position in his profession were Herculean. In those ages when the art was a living one, and when it was natural to build in one style, with all the life and surroundings in harmony with it, the task of designing must have been an easier one, comparatively speaking. No question of "style" would arise; doubtless there were schools of thought, and variety of design, but it ran in the same direction, and was, so to speak, academical, governed by fixed laws and principles. At the present time what chaos reigned, what confusion of styles! The student looking abroad in these days was bewildered, and needed, in fact, to put on "barnacles" to assist his mental vision. Sorrowfully, perhaps, he looked back nearly half a century to the time when men saw that Gothic was fair to look upon, and enthusiastically took up its study. He might smile at much that was done, but he could not but love those who had gone for the faith they had. Now the great Gothic wave had spent itself,—had done its appointed work,—and a restless nineteenth century craves for other food. It was to be regretted that a certain amount of indifferentism had sprung up in the profession, and that men were pandering to a taste and working in a style,—or no style,—in which belief was wanting. Architecture, chiefly in civil and domestic buildings, had caught a kind of scarlet fever, and entered upon a phase of its history which might be called "the red and rubbed brick era." For ecclesiastical work Gothic still claimed the largest share, and we possessed buildings which showed an extraordinary advance upon what was done only a few years back. The works alluded to (those of acknowledged masters of the art of architecture) were distinguished by greater breadth and less fussiness. The details of a cathedral were not stuck upon a parish church; large wall surfaces were left to tell their own tale,—to suggest repose and to heighten features and detail,—the latter more sparingly applied. Adverting to the "Queen Anne" style, Mr. Adams observed that there was much that was lovable about it, and when its features and characteristics were duly kept within bounds, great piquancy of effect might be gained, and dignity also. Unfortunately, in the rage for novelty, men had overlooked or forgotten the lesson which the modern Gothic masters had learnt. Sketch-book detail again made its appearance,—frequently without rhyme or reason,—and buildings were stuck about with the most extraordinary-looking "barnacles,"—memorial-tablet detail, porches stopped off at the bed-mould of the cornice, and pilasters like Sir Frederick Leighton's description of Cleopatra's Needle in its new home: "emphasing nothing, by nothing emphasised." Wide openings covered with flat arches, so thin that they could not hold themselves up alone, and which had, for their own support, as well as for the weight they should carry, concealed iron girders; ironwork painted and made to look like woodwork, so as to escape the Building Act; these and other eccentricities too numerous to mention were "barnacles" so persistent and parasitical in their growth that they eat into the very life of architecture, and bring its practitioners into ridicule. These things were done by men who knew better, and it was to such work that many students looked up, finding it to be fashionable. Was this the kind of work that would make the student honest and truthful in what he did? Could it be reconciled with the motto of the Association, "Design with Beauty, Build in Truth"? One great lesson to be learnt from "barnacles" was that "Unity is strength." Architects had too long failed to recognise and act upon that lesson, although a notable instance of the power for good resulting from its recognition was seen in the Architectural Association itself. After some further remarks under this head, Mr. Adams proceeded as follows:—

It would seem to be the tendency of modern times to subdivide labour, and more and more we see that specialism is spreading. In all other professions we note this sub-division of labour, and there are signs, not to be disregarded, in our own. Church restoration and church building are for the most part in the hands of comparatively few men; this is more notably the case when the church to be restored or built is in the hands of a committee, and many a man, probably every bit as competent, is set on one side because Mr. Somebodyelse has been fortunate enough to be better known as a church restorer or builder. Again, in school, workhouse, and hospital building, in sanitary engineering,—alas! here as a profession we have ourselves to blame,—much that would come to us we have as a body turned from as beneath our serious notice. This work and much else has drifted into other channels, and is no longer thought by the public to belong to the profession of architects. Does it not, therefore, behove us to be looking well into this matter, and if specialism is to be the modern order of things, for a young man to consider carefully where his particular bent may lie, and then to turn his special attention in that direction, after carefully weighing his future prospects, if he has any, of getting work? To do this, there can be no doubt that a general study of his profession will be the wisest course to pursue; but, with a definite aim before him, he will cultivate more assiduously that particular study which will fit him for the place he desires to succeed in, and, taking a leaf out of the book of the young barnacle, will devote all his energies to getting a firm grip of it, going beneath the surface and making himself master of the situation. Doubtless, perhaps without knowing it, most men follow their particular hobby in work. I only speak of those who are really in earnest about it, and who mean to succeed; but if in the future this sub-division of work is to be a recognised feature, then it will not be wise to neglect the signs of the times. Specialism, I suppose, of all kinds, has a tendency to become cramping to the intellect, and somewhat tyrannical in its effects; on the other hand, in the liberal and mechanical arts, we do find and must recognise that men whose whole time and energies are devoted to special branches, in painting and sculpture, or the making of particular machines or articles of manufacture, attain a precision and accuracy which are very remarkable, and seemingly only attainable by such a system. In Medicine and Surgery, we see essentially this system of specialism; and in our sister profession of engineering, we

have its members devoting themselves to separate and distinct subjects, and obtaining in each the most marvellous results, for

"These are the works of the age, the marvels of men and of mind."

But architecture, which is as old as the hills, is more conservative. Most of us hitherto, in practice, lay ourselves open for each and every thing that may come in the way. But our masters, the public, are becoming more critical; art education is telling its tale, and clients look about for themselves, look with discriminating eye before they decide upon whom they will employ, and often choose the man who has given special evidence of his capacity to meet the requirements which they need. Do we not ourselves use this discretion? Formerly we went to the general medical practitioner for every ailment, but now if it is within our means we go to the man whose reputation lies in healing the eye, the liver, the lungs, the brain, rheumatism, gout, and the many other ailments flesh is heir to; and then in surgery how many are the divisions? Certainly here the system seems to work well; certain it is that the public think so too, and it would be useless for the medical profession to disregard the facts or fight against it. So far from doing that, we find that general practitioners rather encourage it, and when in difficulty consult the specialists, and send their patients to them for advice, and act with them in consultation. No jealousy exists, and science is undobtedly advanced by the powers of the mind being devoted to the mastering of one subject.

Engineering, too, as we have noticed, includes branches too nnmerous to mention. It would seem, then, only natural in the order of things, that in our own profession we shall see the same barnacle action taking place, for your barnacle is a specialist too. If with the spread of knowledge, of science, and of art we are to hold our place before the world, it must be as men proficient in what we undertake. So numerous now are the various works that the architect is thought to include, and be master of, that it is simply impossible in the time at his disposal that he can be a proficient in all of them. Work of every kind and description connected with architecture is daily, one may almost say, being filched from us, and men and companies are started for doing that which would be better done by architects who, trained in youth to the profession, elected a particular branch or branches to practise in. Our work is frequently done by men who have only a slight acquaintance with the art and science of architecture, and professional architects too often get the blame. If, instead of this, special branches were taken up by men educated as architects on a broader basis, I think we should see much the same result as exists in the medical and other professions, and we should have a class of specialists who could be called in in consultation by their professional brethren as necessity arose. In alluding to this subject, it must be borne in mind that such remarks apply more particularly to the city we live in, and other large cities, but we cannot look abroad without seeing how this tendency to head centres is a feature of the age.

The advantages to be gained by this system would seem to be this. The profession of architecture would stand better in the eyes of the public by the proficiency of men in its various branches; work connected with building, &c., instead of drifting into other quarters, and being done by men who have little or no knowledge of architecture, would be kept in the profession and be looked upon as belonging to it. A slight acquaintance with the work of outside specialists is enough to show how hideous they can make the work they touch, and how in their desire, and a worthy one it is, to make their own work successful, they utterly disregard all considerations of the claims of art. They are, it is to be feared, too often glad to show that architects know nothing about the particular branch they take up. But already the public is alarmed at the cost of sanitary reform initiated more particularly by these specialists, and the accounts we hear of the cost involved are sometimes startling. Now we have this matter a good deal in our own hands, and much else, such as warming, ventilation, &c. A general knowledge, at all events, of principles and practice, is essential to every practitioner, but if we had more men like those who read papers and spoke upon the subject of sanitation, &c., last session, we should be able in any difficulty, with the consent of our clients, or on our own behalf, as the case might be, to call in one of these gentlemen to advise. Now, there would be nothing *infra dig.* in such a course, for, as we have seen, it is so in other professions. A feeling of *esprit de corps* would animate the consulting and consulted architect, and the advice would be given with a knowledge of the whole case and all its difficulties, both working in the same interests for the benefit of the client. Again, in special matters of construction, design, decoration, and what not, the same system could be adopted more than it is now, to the great gain of the public and the profession. And the esteem of the former would be increased, if our employers found that we contained in our ranks all the elements for meeting whatever question arose without going to outsiders for information, and involving them in large extra expenses thereby.

There are barnacles and barnacles. Some spend their lives at home, others are great travellers,—visit many countries, cross many waters,—but beyond sustaining the life that is in them, apparently gain little advantages from this mode of spending their lives. The moral that we may draw from this is that there are students and students. Some, from necessity or inclination, stay at home, and some are fortunate enough to be able to travel and visit many countries. The pursuit of the beautiful is a necessary study for all who aspire to the highest qualifications of an architect, to be, before and above all else, an *artist*; but, to make use of his studies, he should not only be a sketcher of what will look pretty in his sketch-book, but should observe the object upon which his attention is turned, and try and discover in it what was the motive of the man who executed the work, the materials of which it is composed, the colour which charms, and how this pleasurable effect of colour is produced, whether solely from the kindly hand of time, or intentionally. Then the plan,—generally one of the most important factors,—the mode of construction, the height from the ground and from where viewed and intended to be viewed. Now, all this necessarily takes a long time, and nineteenth-century rush so pervades our modern system that few will take this trouble. To pursue such a course of study will not fill the sketch-book, and is too irksome. I think we often place too much importance upon the sketch-book as a show-book. I remember, some years ago, when seeking employment, showing my sketches to a very distinguished architect. He was kind enough to compliment me upon them, but added, "I should better like to see them loaded with figures." There is no doubt, I think, of the wisdom of such a course. Your drawings will not look pretty, but you will have facts to correct fancies, and I think no one who adopts this course regrets it. You see some pretty little piece of architecture, sketch it, gloat over it, and show it to your friends as something very choice. Years after you wish to refer to it; then, may be, your recollection of its plan, situation and construction, the materials of which it was composed, are gone from you. Now, had all this been noted down and measured, the system, though laborious and sometimes a drudgery, would have been the means of impressing it upon your mind, and your drawing would have been of greater use. Of course, many do this, and so great is the importance of such a course of study known to be by those qualified to judge, that the prizes for sketching old work are mainly based upon the principles I have enumerated. I believe a favourite maxim of the late Mr. William Burges was "Sketch and measure, measure and sketch," short and to the point, like most of the clever things he said. Some may think it unnecessary to call attention to what every student knows, but my own observation is that though students may know it, the system is not so universally practised; and that the neglect of this thorough way of sketching is the cause of a great deal of weak and senseless detail in modern building. Rushing through towns and cities making pretty sketches is a very charming amusement, but if it is to be of real architectural value to yourself and others, beyond the ephemeral pleasure of looking at pretty drawings, no other way is of use than the one touched upon. The rambling method will leave the student a travelled barnacle, with little real professional gain. The habit of thoughtfully working out one subject, and mastering it, is worth a bookful of "bits": it conduces to an increase of reasoning power by going to the root of the matter, which, when we are at work upon designs for our own buildings, gives method and reason for what is produced. It seems to me an absolute necessity in early years to pursue this system, as experience is gained, the student learns to discriminate and to jot down all the salient points of his study, and to economise labour upon it, but only after many years of toil and a peculiar faculty which some possess above others for grasping the essential, and showing only what is absolutely necessary to express this to yourself and others. Mr. E. W. Godwin's method of sketching old work may be quoted and pointed to as illustrating my meaning. Another useful way of making foreign travel of real use is the habit of keeping a concise and careful diary. It is, of course, rather irksome, but of the great advantage of so doing there can be little doubt; and when daylight gives over, and the student returns to his quarters of an evening, he would find plenty of occupation, and a pleasant way of passing what is often a very weary time. This occupation must greatly advance a student's general education; it teaches him to express his thoughts and ideas intelligibly, practising him in composition, and gives a habit of observation and a facility of expression which in after years will be of enormous advantage in writing reports for committees, papers to be read before such bodies as ours, and, may be, books to be published. Work to be done on the spot, whether sketching or writing, is conducive to habits of accuracy, and is of a value hardly possible to exaggerate.

Let us now consider "barnacles" in their nature of parasites, of which they are a species. The practice of architecture is not free from parasitical growth, and its progress is often impeded by it. In our day one great danger has arisen from the excessive prominence given to draughtsmanship and perspective drawing. The art of photo-lithography, whereby the actual handwork of the artist can be reproduced in fac-simile, has been an immense gain; its cheapness offers great advantages, and men have not been slow to seize them. The development of pen-and-ink drawings has largely fostered the production, and we have in our profession some exceedingly clever masters of the art. The professional journals have almost universally adopted photo-lithography for their illustrations. Most men like to see their works in print, and the facilities now offered for achieving this are so numerous, the demand so great, that it is not surprising that a large supply has followed. Now, valuable and useful as all this is, it is to be feared,—and you will remember that Professor Kerr warned us against the danger,—that young men, seeing the ease with which they can get their works thus copied, devote the greater part of their time to making pretty drawings, and obtaining excellence in the mechanical and artistic use of the pen, and this, it is to be feared, to the exclusion of more useful studies in the art and science of their profession. To be a good draughtsman is to possess a power which will stand the student in good stead, but if it tempts him to make pretty sketches and design elevations and details, which will not work, are not constructive, or are not the outcome of that primary necessity of all good architecture,—a well and carefully considered plan,—then such work is not true architecture, but a parasite. The study of such drawing is, of course, fascinating, and it is no wonder that the artist may in the pursuit of it, lose sight of the drier part of his work, which demands that he must give an intelligible reason for his design, and that it shall above all else be truthful. We are too apt, so critical have we become now-a-days in this matter of draughtsmanship, to lay too much stress upon the drawing and too little upon the design as a whole; and so important is this felt to be, that there has sprung up a class of specialists who undertake this class of work, and who can design elevations by the yard and make impossible perspectives, and if by chance we see works so represented carried into execution, we hardly recognise them. Useful, too, as perspective drawing is, the same tendency to exaggerate its use and to deceive is very noticeable.

One of the greatest encouragements to showy drawings has been the competition system, of which we have heard and do hear so much. The man who goes in to win a competition knows perfectly well that his chances of success generally lie in producing a fine set of drawings. It is not, therefore, much wonder that this should beget a race of draughtsmen-architects who know how to tickle the fancies of the Dog-

berries and their companions by designs for buildings which cannot possibly be executed for the money as designed, and which, if chosen, have to go through the mill and be ground down and thinned. The competition system, as too generally practised, has favoured the barnacle growth to an alarming extent, and the good ship Architecture has been much hindered in her course in consequence. Happily, much of this evil has been remedied, and it is, fortunately, becoming the custom to call in a professional assessor to advise committees. So much has been said on this subject, that I will not weary you now with any remarks upon it. Many of us are looking forward with some interest to see what the Council of the Royal Institute of British Architects are going to do in the matter of the memorial presented to them last year, followed by the report of the committee specially formed for the purpose of formulating a scheme for the better conduct of competitions. The matter is one of serious importance to the profession, and the barnacle cohesion given to the memorial was a proof of the interest taken in the matter, and how keenly men felt the injustice of the system as generally carried out. If the appointment of a professional assessor is the *sine quâ non* of all respectable architects consenting to join in a public competition, the death-blow will be given to the profession and calling of paper architects; these barnacles may be knocked off, and architecture, once relieved from this incubus, speed more easily on her way. No one in his senses is sanguine enough to suppose that the appointment of a professional assessor is the panacea for all the evils of the system, but fair play is a jewel, and every man who knows his work and loves uprightness will feel that in the hands of a man of honour and skill, his design will be judged, as far as fallible human nature can judge, on its fair merits.

Barnacles, you have observed, attach themselves to an object on the underside of it: are, in fact, out of sight, so that one does not notice them. If you will take the trouble to look you find them, or you may "nose them" if their habitation has become stranded high and dry. This habit of the barnacles brings me to another part of my subject to which they must render me their services as an illustration. Foundations, timbering, drainage, sanitary appliances, gas and water pipes, bell-wires, &c., are out of sight, often below the surface, and veritably it may be said of many an unsavoury smell, "You shall nose him as you go up the stairs into the lobby." Now we have heard so much about sanitation in all its branches, that I have not the slightest intention of entering into its mysteries; my only object in alluding to it now is to impress upon students the positive necessity of making themselves acquainted with the subject of sanitation. Immense progress has been made in this science of late years, but it is too much the fashion among enthusiastic young architects to ignore this branch of their work. Well, at first sight it is unsavoury, dull, and dry, and perhaps much of it is nasty. It is not a high art, but you must come down from the sky and lower the tilt of your æsthetic nose; the neglect of the study, and mastering of its rudiments at least, will beget a growth of barnacles, which will assuredly impede your progress to the shores of success. A few years back, and most men left all this seemingly unpleasant work to the builder or clerk of the works. Science, with her powerful "barnacles" on, has peeped into the hidden mysteries of health and impediments to health, has found out causes against which Medicine is powerless, and, looking deeper into causes, has discovered that they arise, almost invariably, from neglect of nature's laws, and that the seeds of disease and death are frequently to be found sown in the houses we live in. The note of alarm has been raised, daylight has flooded in upon the hidden horrors, and they have been revealed in all their bare hideousness. We know now that death is often taken into the home, and sewer gas,—that deadly upas-tree,—is responsible for more misery and disease than most of us have any idea of at all. I say we know this *now*, and it is simply criminal in any of us who are called upon to design buildings if we neglect the warning. Make yourselves masters of your art; but, neglect this, leave it to others to do in a kind of haphazard way, and you will most assuredly find that the opportunities of displaying your designing powers will be limited to paper and to your own offices. Nowadays most men are alive to this important subject. "Be sure you see to the drains," is over and over again the remark that you are met with by your clients. You will come across men thoroughly up in the principles of modern sanitation. You will, at the outset of a job, be asked what you advise; how you propose dealing with this problem, this or that soil, this or that system. If you answer, "My dear sir, you surely don't expect *me* to go into such matters; that matter is for the clerk of the works or the builder," then all I can say is, you will fall a great many degrees in the opinion of your clients; you will harm the profession to which you should be proud to belong; you will give cause for the remarks one so often has thrown in one's face, that architects are impracticable people, and do not know their work. This and much else has drifted from the profession, because we have hitherto too much neglected it, and a race of sanitary engineers has sprung up to do it instead. To ignore this class of work is so very foolish. Suppose a young architect, just established in practice. He must not expect to be building mansions all at once; he is called in for some small alterations, some revision of the drainage system is needed. If he can undertake this, and achieve success in it with careful thought and still more careful superintendence, he will win the confidence of his employer, and add to his chances of procuring more work. Now, supposing he adheres to the idea of the fine arts being the exclusive *rôle* of the architect, and that his soul is not to be worried by such "unconsidered trifles" as drains; the probabilities are he will disgust his employer, who will politely but firmly get rid of him on the first opportunity, and thus a chance of success, a step upon the ladder, has been lost, and with the ever-increasing number of aspirants for fame, you cannot afford to lose one single opportunity of winning your way. Clients are right in making us careful; the lives of those nearest and dearest to them may lie in our hands, and they will not be clean if, through carelessness and wilful neglect of what is now patent to any inquirer, we neglect the warning and go on blindly disregarding all the lessons of the past.

A paper treating of impediments to the progress of architecture would hardly be complete without some allusion to that great feature of modern times, speculative building. Here, barnacles of every kind and degree congregate, and, unchecked, hinder and impede all true progress. Naturalists tell us that the young barnacle is cyclopean, and makes use of his one eye to find a resting-place, and, pouncing down upon the first favourable one, there establishes himself. And then, quickly and with wondrous growth and fertility, shell houses gather all around him, until he has covered every available space with his progeny. Is not the speculative builder similar somewhat in his habits? His one idea is gain; he fixes his eye steadily upon some favourable spot, attaches himself to it with a firm grip, and then quickly covers the land with his creations, gathers to himself a whole host of other barnacles, until we no longer recognise the land he has covered. A parasite of the parasites is speculative building as too generally practised. It would be most unfair to gibbet thus all speculative builders. Some are men of high honour, to whom we owe a debt of gratitude. They are the pioneers of civilisation, who give fair money's worth; I only allude to the disreputable class of speculative builders who prey upon an ignorant public. They are not all to blame. Feeding upon them in their turn are the owners of the land they settle upon, who exact terms which are a premium upon dishonesty. Then, again, there are lawyers, and, it is to be feared, surveyors too, of a certain class, who fasten upon the unfortunate builders and suck them nearly dry; and, lastly, a greedy public, who grind them down to the lowest farthing. The blame is all round, I fear, and architects in their professional capacity can do little to remedy the evil. They are seldom consulted, beyond occasionally supplying plans, and except in the better class of speculative building, never in superintending the carrying out of them.

I must not try your patience any longer; doubtless other and better applications of the parable could be found. We might consider the barnacle as a species of goose or duck, and apply the *simile* without difficulty to much that is passing around us in the architectural world; for, verily, we see a great deal of goosedom, quacks, quackery, and quackdom, no end, to touch in detail upon which would carry us far into the night; but, like *Caliban* in the "Tempest," I must exclaim, "I will have none on't; we shall lose our time, and all be turn'd to barnacles." I am afraid that much that I have put down here is "bald, disjointed chat," but the paper has been written at odd times. In venturing to offer advice, and to point out what I consider the right road to success, I feel very much like a sign-post, but you will be generous enough to accord to me right motives, and to believe that under the fanciful title of "Barnacles" I have endeavoured to be of some service to you in raising the warning voice, and in inculcating truths which may stand you in good stead in the profession you have chosen. I know I have taken great liberties with my *simile*, employing it alike for men and things, but I trust you have been able to see my meaning, and that it will not be necessary to assist your mental vision with the use of "barnacles," which, Nuttall informs us, is an old name for a pair of spectacles.

We reserve our report of the discussion until next week.

FULHAM UNION INFIRMARY COMPETITION.

We have already mentioned that the Fulham Board of Guardians had had under their consideration the selection of a plan from among several which were submitted in competition for the proposed new infirmary, and had finally agreed to a motion to adopt the plan recommended by Mr. Currey, who has been assisting the Board with his professional advice on the subject. The drawings which have been submitted have been on view during part of the present week in a room in the Fulham Union Workhouse. Anything like a detailed examination and comparison of the plans, has, however, hardly been possible, owing to the small scale of the drawings, the height at which many of them are placed, and the very bad light in the recent state of the London atmosphere. We have only been able to give a glance at two or three of the sets which have been most prominently put forward in the discussion. Most of the competitors appear to have adopted the pavilion plan, with connecting corridors, which, in one shape or another, is now pretty well regarded as a *sine quâ non* in such cases. The distinctions between the various plans run therefore principally into matters of detail in the arrangement of the smaller accessory departments, such as entrances and business rooms, and the situation of the day-rooms in reference to the wards. The plan marked "Experience" in a circle (there is another also signed "Experience") is the one recommended for adoption, and which, from the report of the last meeting of the Board, we presume must be considered as adopted. The sick wards run nearly north and south out of the main corridor, with windows on the east and west sides, two beds between each window on each side, making thirty-two beds per ward, the number which it is understood was stipulated for. The bath-rooms and w.c.'s in connexion with each ward are reached by a passage across the end of the ward opening out of it, the bath-room opening from one end of this passage, and the w.c.'s from the other end. So far the plan is satisfactory, but some other parts of the arrangement are not so good. The day-rooms for each ward open from the other side of the passage opposite to the ward doors. We approve of isolating the day-room from the sick ward, but we consider it rather a clumsy arrangement to drive the main passage of the interior traffic of the building between them; it would have been better to have given the sick ward and the day-room a lobby common to both, which would have sufficiently broken the communication without crossing the main corridor. The day-rooms, which seem rather small, are planned in a good shape for getting the advantage of varied directions of sunlight, but the placing of the room for stores on one side of the small lobby entering on the day-room, and the water-closet immediately opposite, can hardly be called a good one; a small lobby does intervene between the water-closet and the entrance-lobby, but it is an unlighted and unventilated one as far as the plans show, and the author seems to have overlooked the fact that a lobby of discommunication in such a position is not of much value unless it can have a window opening to the external air. The reception-rooms for new patients would certainly have been more satisfactory if the necessary bath had been arranged in a small second room or recess,

instead of standing in the middle of the floor of the reception-room. In the main entrance arrangements the author seems to have been led away by the desire for symmetry of arrangement on paper which is often a stumbling-block in planning. Thus we find the matron's office on one side of the wide central entrance, and her sitting-room on the other side; the two should certainly have been *en suite*, for comfort and convenience. The porter's department is divided on each side of the outer entrance in a similar manner. Some of these details would be susceptible of re-arrangement, which ought to be insisted on if this plan is actually carried out. Otherwise we do not find fault with the selection in the main. The elevations are neat and suitable for the purpose, and the effort seems to have been made to render them agreeable in appearance so far as a rigid attention to economy would admit of, and in this respect these drawings are about the most successful of the sets. Those marked "Simplicity," which have also received a premium, deal pretty fairly with the problem, but present nothing for special comment. The other set of plans marked "Experience" provide for the planning of the day-rooms partially *en suite* with the wards, in the way we have suggested above, but the light at one end of these rooms only is insufficient to make a cheerful room. The set marked "Hôtel Dieu" is better planned in regard to the accessories and entrances than any other we were able to examine, but the wards do not present the required accommodation as to number of beds, and the system of making the day-room practically a passage to the ward, which opens directly out of it, cannot be commended. There is, however, a good deal of ability shown in this set of plans, and the author has made a praiseworthy endeavour to give some little variety and character to the exterior of the building.

We understand that one or two sets of plans were thrown out in consequence of the employment of distinctive colouring in the floors and walls of the plans, contrary to the stipulation that no colour should be employed. We should be the last to suggest that the conditions of a competition should be treated with laxity, which always gives rise to unfairness towards those who have scrupulously observed them; but at the same time, we may point out, with a view to the regulation of future competitions, that it is a very unnecessary and illogical proceeding to word the conditions so as to disqualify a competitor on account of what is really a means of rendering plans more clear and intelligible. The idea, which is now frequently acted upon, of excluding coloured drawings from competitions, arose in the first instance from a desire to prevent competitors from attempting to impose on the committees or the judges by making effective and *ad captandum* views of the supposed effect of the building when completed, which might have the effect of drawing off the attention from the practical qualities of the plan by mere feats of picturesque draughtsmanship. But the distinction of different parts of a plan by different colours is quite another thing; it is only a simple practical way of making the grouping of a plan more immediately intelligible; it represents no picturesque effect, but is only a mechanical means of clearer delineation. The condition insisted on should be that no colour should be used on elevations and perspectives. It is absurd to disqualify a plan, if good in itself, merely because the author has shaded his walls in red or brown instead of in black. If the conditions have been so worded, no doubt they should be adhered to: that is the only safe rule of right in the case; but they ought not to be so worded, as it may result in disqualifying a competitor merely for having taken more than ordinary pains to render his plans clear to the eye, which is in itself a merit.

The Guardians deserve our applause for the manner in which they have conducted the competition. They called in a professional referee, and they accepted his decision.

Liverpool Engineering Society. — The usual fortnightly meeting, being the last of the session, was held on Wednesday evening last week, at the Royal Institution, Mr. A. Holt, M. Inst. C.E., president, in the chair. After the election of officers for the ensuing session and some other business, the retiring president in his address gave a paper on "The Proposed Elevated Railway along the Liverpool Docks."

JOTTINGS FROM GERMANY.

The Exchange in Berlin. — The *National Zeitung* calls attention to the building erected for the Exchange in Berlin, as being likely to perpetuate during many generations the fame of the late Herr Hitzig, the architect. The marble pillars of the interior, which serve as supports to the galleries, are described as being well in keeping with the magnificent columns and pilasters of the façade. The floor of the exchange-room was constructed, it appears, according to the plans of a subordinate; and it is noticed that in this particular the skill and taste shown in the other features of the central hall has been absent. The flooring being of wood, clouds of dust arise shortly after the business of the day has begun. The ventilation is said to be insufficient, and not of a nature to prevent the dust from being inhaled by those in the hall. The noxious effects of this arrangement are said to be well known. As some additions are now about to be made to the building, the journal we have quoted urges the laying down of tiles instead of the wooden flooring referred to.

Workmen's Schools.—The establishment of a technical school for workmen engaged in the iron trade, at Bochum, is approved by the German Press as being a step towards meeting a general want. The *Kölnische Zeitung* remarks that technical schools of a high class are abundant, while workmen have had but little opportunity (as far as the iron trade is concerned) of acquiring that description of knowledge required by foremen, &c., and which cannot be gained with any amount of practice in such a definite way as to enable a man to direct the carrying out with exactness of various metallurgical processes incident to the daily work of the craft. It is also remarked with justice that this class of instruction resembles the training which a well-tutored non-commissioned officer has received, and the fact that the German Government has of late years devoted particular attention to that branch of military organisation is adduced in proof of the necessity for the establishment in other iron districts of schools on the same plan as that of Bochum.

The institution in question has in a measure grown out of the local commercial school, and in its general plan is similar to the School of Mining in that town, the president of which, Dr. Schulz, has drawn up the programme of the new establishment, for which a director has apparently not yet been appointed. The mining industry allows of an arrangement by means of which students at the school can work in the pits for a part of the day, and thus support themselves during their period of study. This system does not prevail in the iron trade, and, consequently, provision has to be made for the maintenance of scholars attending the new establishment. To meet this charge the Government will, for twelve years, give a grant of 700*l.* per annum, the remainder of the cost being defrayed by the municipality.

There is to be a preparatory course lasting six months, after which the student takes up one of the sections of the advanced course, which lasts a year. The latter is divided into metallurgical and constructive branches. The former deals with the manufacture of iron, and the latter with machinery of all kinds, mechanical drawing, &c.

Monumental Architecture. — The monument lately erected at Munich by Professor Halbig for the Wagner family, is favourably noticed in the German press. From a foundation of syenite there rises on a simply-formed stand a bust of the deceased, in Carrara marble. A mourning female form (also in Carrara marble) leans towards the bust, around the base of which a garland of roses is thrown, the left hand of the figure being so arranged as to hold flowing drapery. A veil is thrown over the head, and droops over the neck. Opposite this figure, and completing the group, is a richly-adorned candelabra, standing on a light and gracefully-designed column, and with a burning flame symbolic of life. An imposing semicircular arch of syenite, with richly-gilt Byzantine ornamentation, forms the background. The whole is crowned by a beautifully-executed crucifix, in gilded bronze, in which the expression of the Saviour's countenance is described as being strikingly affecting.

A monumental fountain has been erected at Hanover, from the plans of Professor Hase, the figures having been designed by Professor Engelhard. The lower basin is 9 ft. 3 in. in diameter, from the middle of which rises an octagonal column, with projecting leaf capital, supporting a second basin of 4 ft. 6 in. diameter. A frieze surrounds the upper border of the latter, in which eight lions' heads serve as outlets for the water. The octagonal column here becomes quadrangular. The work is surmounted by two allegorical figures representing horticulture and fishing, above which rises a column, at the summit of which is a tabernacle, from which springs a flag-staff, with the arms of Hanover. The basement is of sandstone, and the rest of the work of bronze. The casting is by Gladenbeck, of Berlin, and the effect produced by the colour is as if the fountain had been standing for centuries in the position it now occupies, between the Marktkirche and the Rathhaus.

ART-STUDENTS' HOME.

ON Wednesday, the 7th, the Baroness and Mr. Burdett Coutts entertained, at their house in Stratton-street, the young ladies who occupy the Art Students' Home in Brunswick-square, and invited many friends who are interested in art matters to meet them. The art-treasures of the house and some excellent conjuring after supper made the evening too short for the very happy guests. The Home in question, formed in two very good houses in Brunswick-square, was established by the Baroness Burdett Coutts for the purpose of providing students attending art-classes, &c., in London, the comforts and advantages of home and family life, under specified regulations, and the advice and presence of an experienced lady resident, and seems to answer its purpose admirably.

The Home contains, in addition to drawing and dining rooms, good rooms for study. The charge for board and residence inclusive, per term, is at the rate of 21*s.* a week, or for students occupying separate bed-rooms 30*s.* a week. In a few special cases selected by the committee, a reduction from these charges is made. Mrs. Malone is the Lady Resident, and Mr. Thos. Henry Wyatt, a name that will commend itself to many of our readers, is the hon. treasurer. The advantages of this Home have been so well appreciated by the students of Queen-square that it seems desirable that the advantages such homes afford should be extended to localities where other art or training schools exist,—notably in South Kensington. Only, in such a quarter, unless Government or the Commissioners assisted, it would probably be found impracticable to start them satisfactorily. It is to be hoped, however, an endeavour will be made.

STREET ARCHITECTURE IN SUNDERLAND.

THE erection, by Mr. John Coates, cabinet-maker and upholsterer, Sunderland, of a handsome new warehouse at the corner of Fawcett-street and Borough-road, and immediately opposite the new Museum and Library, affords another illustration of the enterprise of local tradesmen. The new edifice, which is all but completed, is in the Classical style, modified to suit the character of other important buildings in the immediate vicinity. The material used is ashlar, from Alnwick quarries. The frontage measures 31 ft. in Fawcett-street and 86 ft. in Borough-road. The more prominent exterior features are that the ground-floor windows, of which in all there are nine, are separated by columns, each alternate one having carved or moulded caps. From these latter spring the heads of the windows, having panelled key-stones. Over the windows on the ground-floor runs a cornice separating them from the windows above, and from this cornice spring pilasters dividing the upper surfaces into bays. Both on the first and second floor each bay contains two round-headed windows, with keystones of the same character as those below. From the top of the pilasters and over the windows rises an elliptical arch. The exterior surface of the building is relieved from plainness by four bow-windows, two on either side of the building, supported on ornamental bases, and encircled with carved balusters. Above the elliptical arches of the higher windows runs the moulded cornice. A prominent feature in the structure is the square tower crowning the south-west corner. This tower has two circular windows on either side, and is surmounted by an ornamental finial. There are two entrances to the building, one being in Fawcett-street and the

other in Borough-road. In the interior the arrangements and facilities for carrying on an extensive business have been carefully studied. The dimensions of the shop on the ground-floor are 57 ft. 6 in. by 34 ft. A sliding wrought-iron partition, which is fireproof, separates the front shop from the finishing department in the rear.

The structure, which was commenced in May last, has been built under the supervision of and from plans drawn by Messrs. J. & T. Tillman, the contractors for the whole of the work being Messrs. Hirst.

Another new warehouse, which is all but completed, is that of Mr. Robert Farrow, oil and paint merchant. The site is in William-street, immediately off High-street, and the structure, which is three stories high, and built of brick, is of a plain but substantial character. The offices are entered from the front street, on the ground-floor, while the main warehouse extends to the back of William-street. The cellars, which are well lighted and ventilated, run beneath the whole area of the building. Above the offices, which extend the full width of the site in William-street, are three warerooms approached from the main warehouse. The latter is entered from the backs of William-street and High-street, where facilities will be afforded for taking wagons in a tramway, and thus loading from the ground-floor, which is so constructed as to be on a level with an ordinary wagon. A hoist for the purpose of loading and receiving goods will also be fitted at the end of the tramway, and this will be of sufficient size and weight-carrying capacity to convey goods of the greatest bulk or weight necessary in the several departments of the trade. The ground and first floors are constructed with rolled iron girders and concrete arched floors, supported on metal columns, every precaution having been taken to provide for the support of the heavy weights which will be placed upon the floors. The second-floor will be appropriated to the storage of the lighter class of goods. The several floors are approached by step-ladders leading from one story to another. All the doors from each floor of the warehouse, and also the main entrance, are protected by iron rolling shutters, the latter together with the hoist having been supplied by Messrs. Bunnett & Co., of Leeds. The building will be filled with all necessary oil-tanks, gantries, &c., to ensure the speedy and efficient despatch of business. The architect is Mr. W. Milburn, jun., of Fawcett-street, and the contractor Mr. T. P. Shaftoe, of Holmside.

THE FIRE AT THE RING THEATRE IN VIENNA.

This ill-fated theatre was quite a modern structure. It was only opened on the 17th of January, 1874, the first piece represented being Rossini's "Barber of Seville." It was built by a joint-stock company, and was intended for the performance of a class of operatic plays which, for various reasons, were unsuitable to the boards of the Grand Imperial Opera. The theatre accordingly bore the name of the Comic Opera. It was erected in the year 1873. The architect was Emil von Förster, a member of the Vienna Architectural Society. The cost was nearly 90,000*l*. It was built to accommodate 1,760 spectators. The parterre contained twenty-three boxes and 330 chairs. The first tier contained twenty-five boxes, the second twenty, while the third and fourth tiers consisted of galleries.

The edifice on the exterior exercised on the spectator a most charming effect. This was due to the rich decoration of the façade with pieces of sculpture, paintings, and gildings. The arrangement of the interior, however, by no means satisfied the requirements of such a house in regard to free access and free egress. The area upon which it was built was comparatively limited, being only 1,760 square mètres. Moreover, of this limited space the best use was not made, inasmuch as extensive refreshment-rooms and *foyers* were built on the first floor. Hence it was not possible to allot more than a limited amount of space to the passages and staircases. From the opening of the theatre complaints had been made by the public that the approaches to the pit and to the *parterre* boxes were through the first floor, and that it was only possible to reach those parts of the house by passing through a number of doors, through the wardrobe-room, and down a winding staircase. Owing to this complicated arrangement it was of constant occurrence that the spectators, on leaving the house after the performance, could not find their way out. It is not surprising, therefore, that many occupants of these portions of the theatre should have fallen victims to the late disastrous fire. But it was amongst the spectators in the third and fourth galleries that the principal sacrifice of life took place. No doubt if, when the gas went out, the oil-lamps which, according to the regulations issued since the catastrophe in the Nice Opera-house in March last, ought to have been burning on the staircases and passages had been lighted, many of the victims would have been saved, but the construction of the approaches to the uppermost parts of the house was radically defective, and it appears doubtful whether under such circumstances the loss of life could have been very materially diminished.

The architect contends that if the fire-blind had been lowered at the right time the loss of life would have been avoided. Unfortunately, however, the required steps never are taken on such occasions.

Mr. Alexander Aird, writing to us from Berlin, says,—"Mr. Fölsch, who is preparing a supplement to his work on 'Fires in Theatres' (reviewed by you April, 1878), tells me that the theatres totally destroyed by fire numbered,—

Between	1850 and	1860	60
„	1860 „	1870	100
„	1870 „	1880	190

And that the terrible case of the Ring Theatre in Vienna is the *twenty-eighth* theatre totally destroyed by fire in the year 1881."

PLASTER.

The third of the series of Cantor lectures, at the Society of Arts, by Mr. Thomas Bolas, F.C.S. (which are on the "Industrial Uses of the Calcium Compounds"), was delivered on Monday, December 5th. After treating with sulphate of lime and its occurrence in Nature, the lecturer mentioned the various qualities and species of gypsum and alabaster, and proceeded to describe plaster of Paris, its preparation and uses. The fireproof concrete of Messrs. Dennett & Ipgle, prepared from highly-calcined gypsum, was shown, and favourably commented upon.

The lecturer also passed round a sample of "Super-super" plaster, manufactured by Messrs. Bellman & Ivey, of Wigmore-street, and called attention to its extremely fine character. The application of plaster in the form of Scagliola marble, as manufactured by the same firm, was explained, and the specimens shown (in which the material was applied to columns, pilasters, wall-linings, and pedestals for statuary) were much admired on account of their high polish and admirable representation of the marbles.

After referring to some of the physical and chemical aspects of the setting of plaster, the lecturer mentioned the use of the material in moulding, stereotyping, and other processes.

REDDITCH AND HEADLESS CROSS DRAINAGE.

The drainage works of this district, for which tenders were invited in the *Builder* some time since, have just been completed under the Local Board.

The sewage from Redditch is conveyed by a system of brick and pipe sewers to precipitating-tanks outside the lower portion of the district, where the solid matter is precipitated and the effluent water passes over 4 acres of fitting ground. This ground is laid in terraces and drained, 25 ft. apart and 5 ft. deep; the filtered sewage-water passes off through these drains into the stream bounding the property. The tanks are placed at such a level that a large area of land in the valley below is commanded for broad irrigation purposes.

The sewage of Headless Cross is taken by a separate system to tanks at the extreme end of this part of the district and will be utilised by irrigation also. Flushing tanks are constructed at the ends of the sewers, fitted with Messrs. Bowes, Scott, & Read's Automatic Flushing Syphon for passing periodical flushes of water through the sewers.

The works have been carried out by Mr. G. Law, contractor, of Kidderminster, at a cost of 8,500*l*., which is within the engineers' estimate, and the works have been completed within the nine months allowed under the contract. Messrs. Gotto & Beesley, of Westminster, are the engineers, and the works have been superintended by Mr. Baylis, the Town Surveyor.

HOUSES AT WALMER, KENT, FOR MR. ALEXANDER TOD.

Walmer is a favourite select seaside place, possessing an unequalled sea view, overlooking the Downs, with their ever-varying panorama of shipping. Though its situation is unique and pleasing, its architecture has been devoid of interest. The houses which were not of wood could boast of but 9-in. walls, covered with cement. Private and lodging houses are much in demand, and Mr. Alexander Tod is now erecting several blocks of houses. Our illustration shows one of the blocks, which is an attempt to improve the existing state of things, and erect houses for the accommodation of visitors which, while picturesque, are well drained and ventilated.

In the house illustrated the lower story is of red bricks. The half-timber work is painted a cream-white, and produces a cheerful contrast with the panels, which are pebble-dashed. The pebbles for dashing have been collected from the sea-shore. The roofs are covered with red tiles. The sills and general dressings are of concrete, which has been cast on the spot.

Mr. Tod has not had any contract. Mr. Robert Redman, the clerk of the works, employed labour. Mr. William Webb acted as foreman of carpenters; Mr. G. Harvey, as foreman of plasterers; and Mr. Pulling, of painting, glazing, and decorative work. The facing bricks are of a dark red colour, made by Mr. C. Richardson, at Teynham.

Messrs. Frost Bros., of Deal, are doing the gas, water, and bell fittings. The baths and stoves are by Messrs. Steven Bros. and Messrs. T. Potter, of London. Mr. Finnis, of Dover, supplied the timber; and Messrs. White Bros., of London, the cement. The tiles are from the works of Messrs. S. & G. Collier, of Reading. The hip-and-valley tiles are purposely made, and work with the tile courses. The angle hanging-tiles are also purposely made to overlap the front angles of the dormers and gables, and thus prevent the wet driving in between the tile-hanging and the woodwork of the windows.

The houses are being erected from the designs and under the personal superintendence of Mr. James Neale, F.S.A., of London.

The eastern block is just completed, and the western block is roofed in and glazed. The central house was existing. It has been thoroughly recast.

BRIGHTON STREET ARCHITECTURE.

PREMISES CORNER OF WEST STREET AND THE KING'S ROAD.

This building is being erected for Mr. Alderman Nottage, of the City of London, and is situated at the south-east corner of West-street and the King's-road. It provides the following accommodation:—A sub-basement, 26 ft. below the footway, arranged for wine-stores; a basement, forming offices to the shops over; seven shops, with offices, and fifty-one rooms over for the purposes of a private hotel, the entrance to which is from the King's-road. There is also a good back entrance from South-street. There will be three hydraulic lifts,—one for passengers, one for luggage, and one for dinners, &c.

The kitchen and offices are on the topmost floor, fronting to South-street. There will be two wide stone staircases from the basement to the top floor.

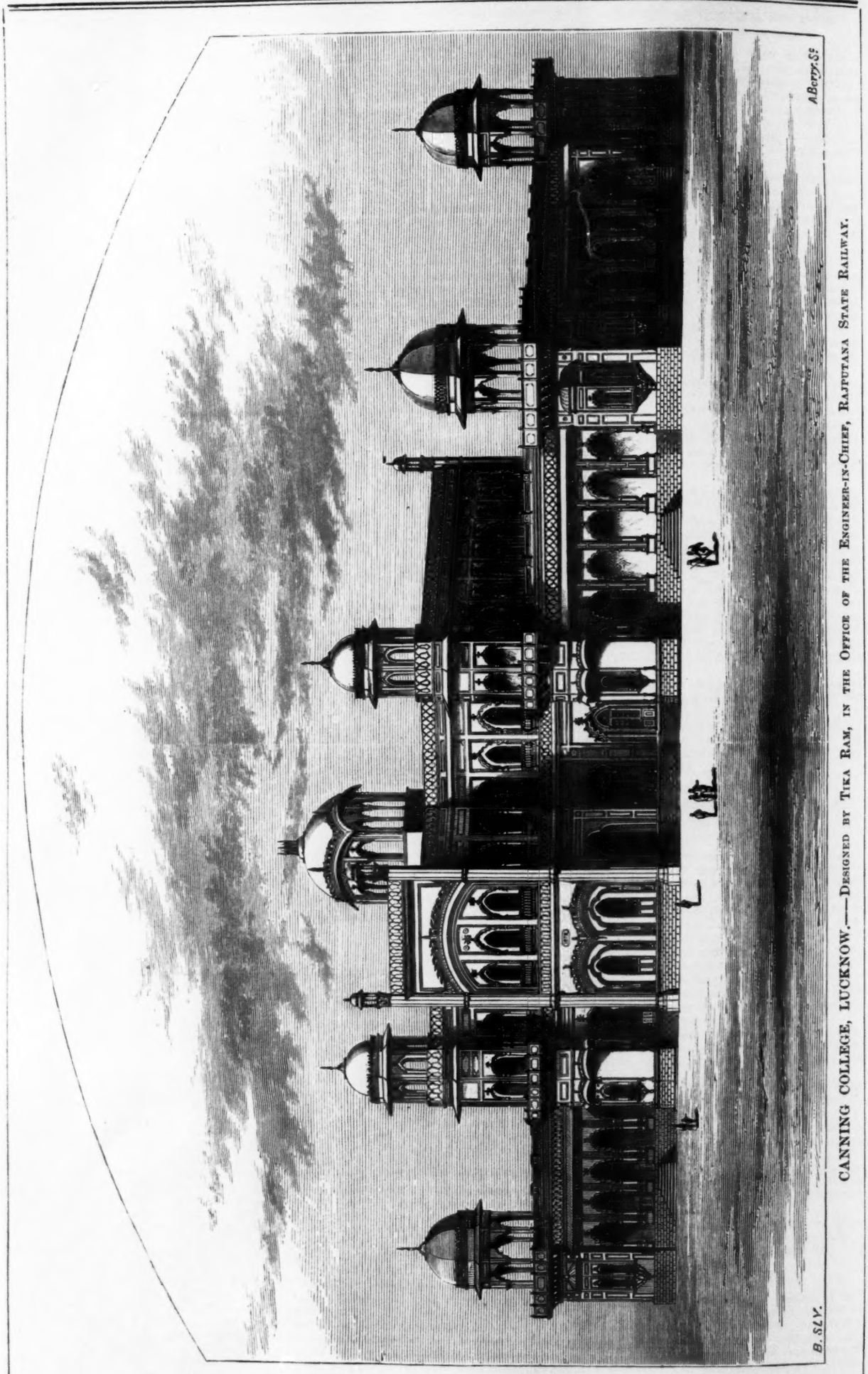
The whole of the interior fittings, including windows, doors and their dressings, skirtings, and so forth, will be of oak, wax polished.

The rooms and staircases will be ventilated, and the staircases and passages warmed from the basement.

The exterior is in the Queen Anne style, the dressings and facings being of terra cotta, in two shades of red, manufactured by the Tamar Terra Cotta Company.

The total cost, inclusive of site, but exclusive of furniture and fittings, will be about 42,000*l*. Messrs. Lainson & Son are the architects.

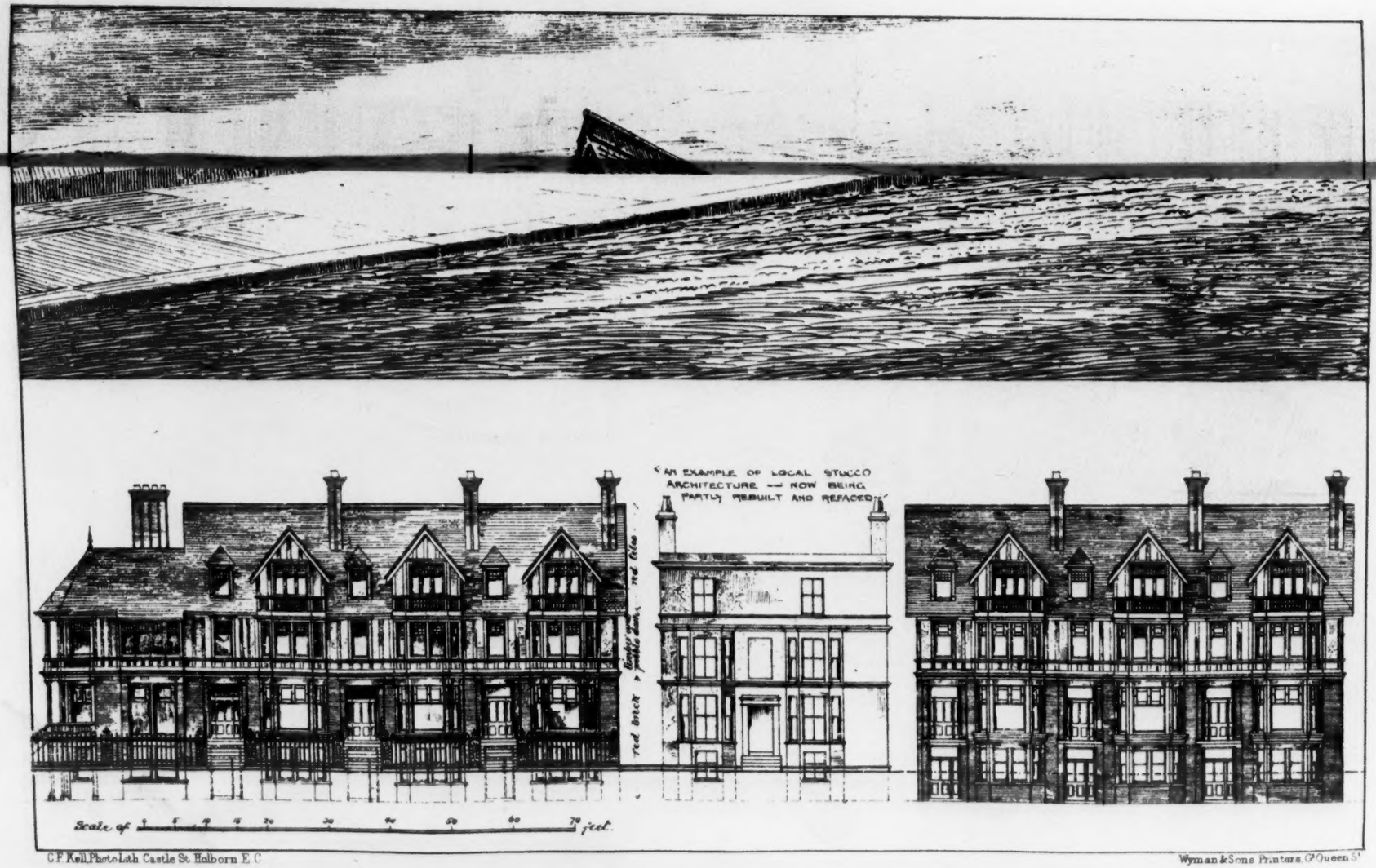
The Council of the Royal School of Art Needle-work has, with the special approval of Her Royal Highness the Princess Louise, forwarded to the Art Furnishers' Alliance, 157, New Bond-street, a magnificent assortment of art needle-work for exhibition during the Christmas vacation.



CANNING COLLEGE, LUCKNOW.—Designed by Tika Ram, in the Office of the Engineer-in-Chief, Rajputana State Railway.

BRIGHTON STREET ARCHITECTURE: PREMISES AT THE CORNER OF WEST STREET AND THE KING'S ROAD.

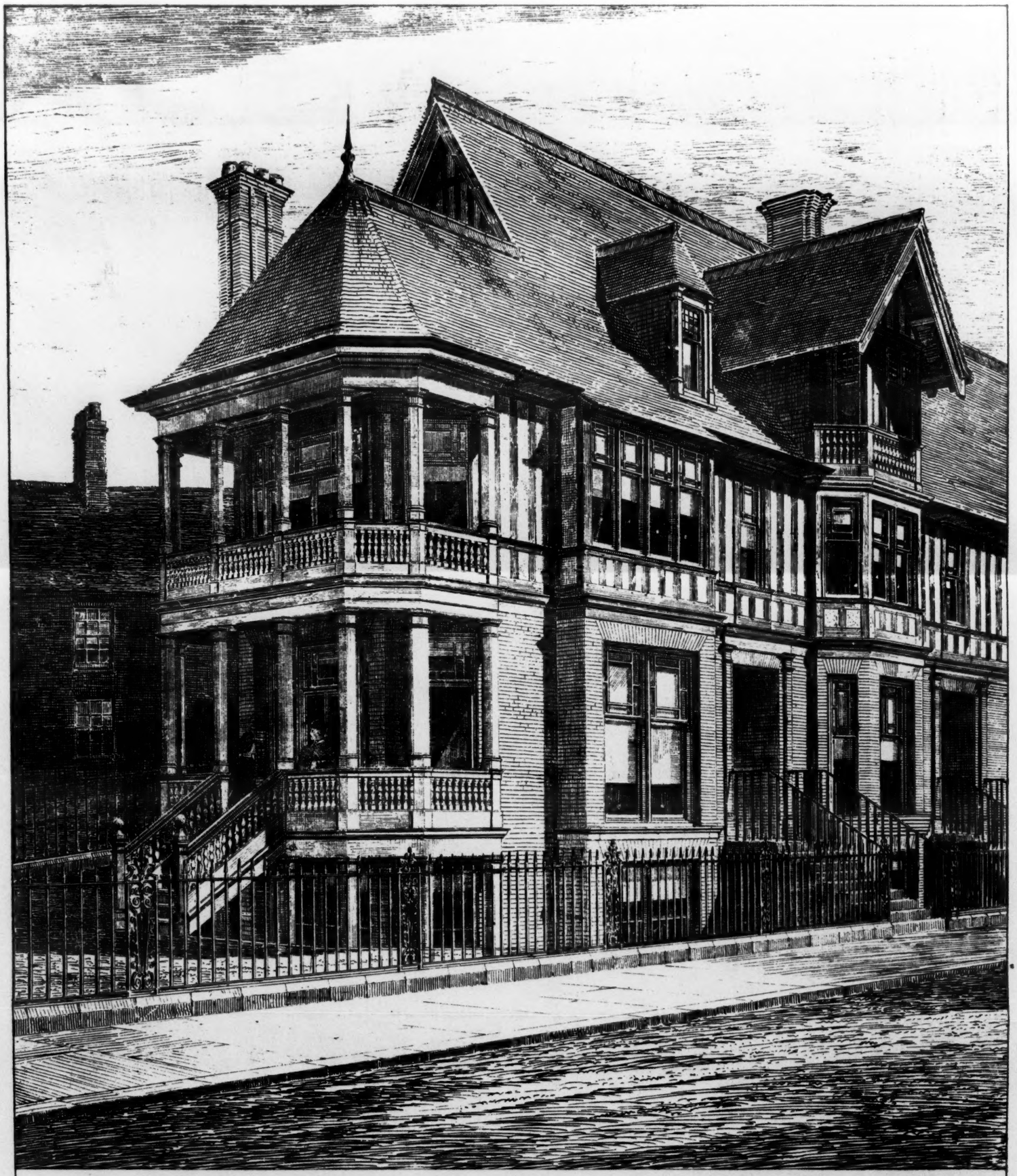
MESSRS. LAINSON & SON, ARCHITECTS.

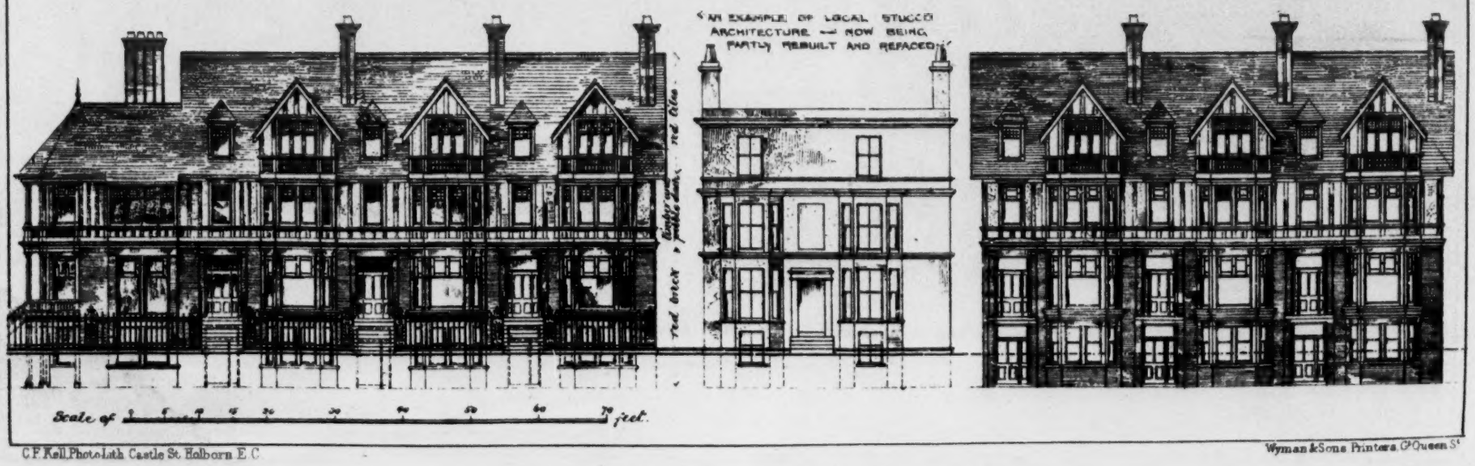

AN EXAMPLE OF LOCAL STUCCO ARCHITECTURE — NOW BEING PARTLY REBUILT AND REFACED
red brick & pattie dark red tiles
Scale of 1 5 0 4 10 20 30 40 50 60 70 feet.

C.F. Kell Photo-Lith Castle St. Holborn E.C.

Wyman & Sons Printers, 74 Queen St.

HOUSES AT WALMER, KENT.—Mr. James Neale, Architect.

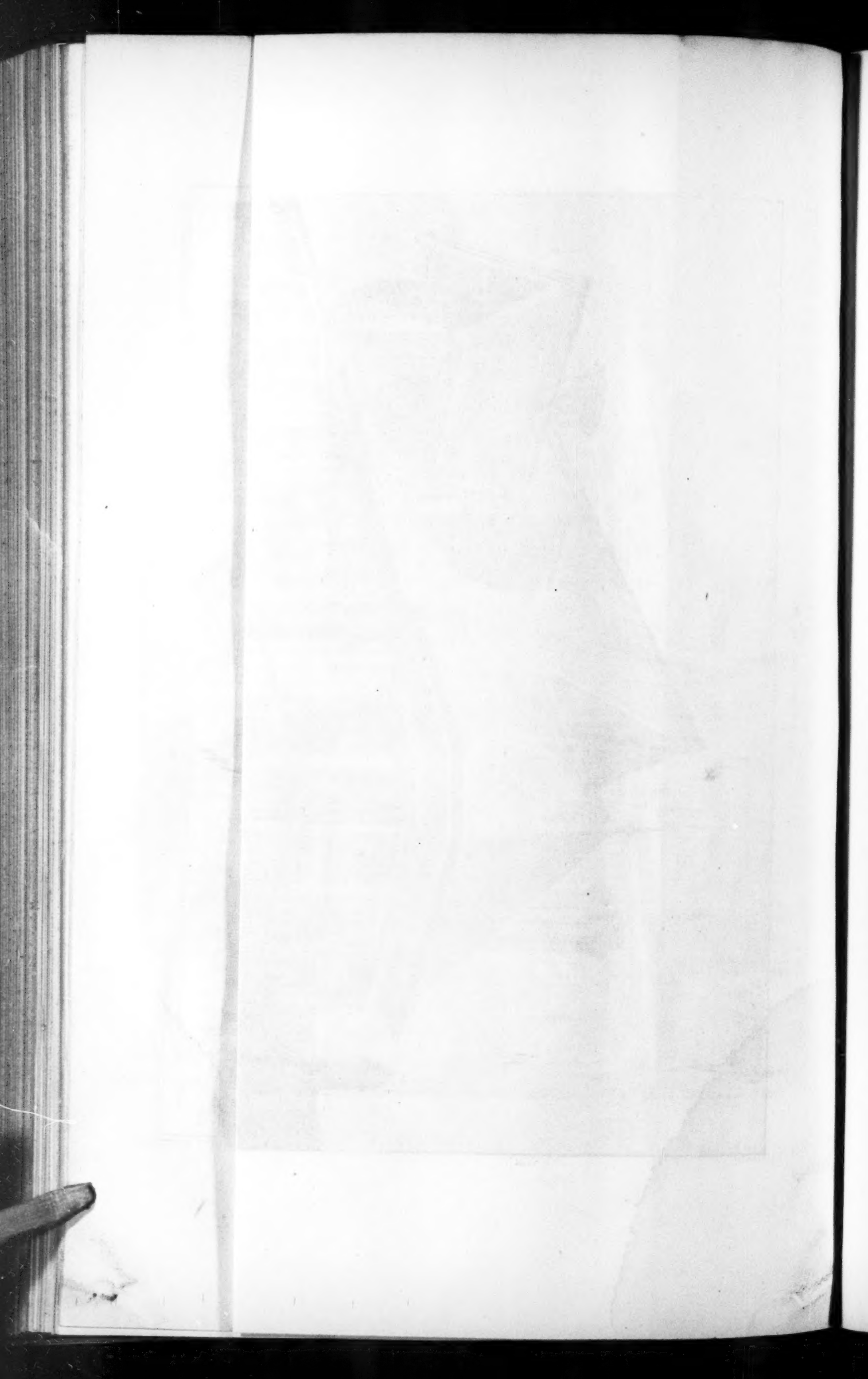



AN EXAMPLE OF LOCAL STUCCO ARCHITECTURE — NOW BEING PARTLY REBUILT AND REFACED
red brick & pebble dash, red tiles
Scale of 0 5 10 15 20 30 40 50 60 70 feet.

C.F. Kell, Photo-Lith. Castle St. Holborn E.C.

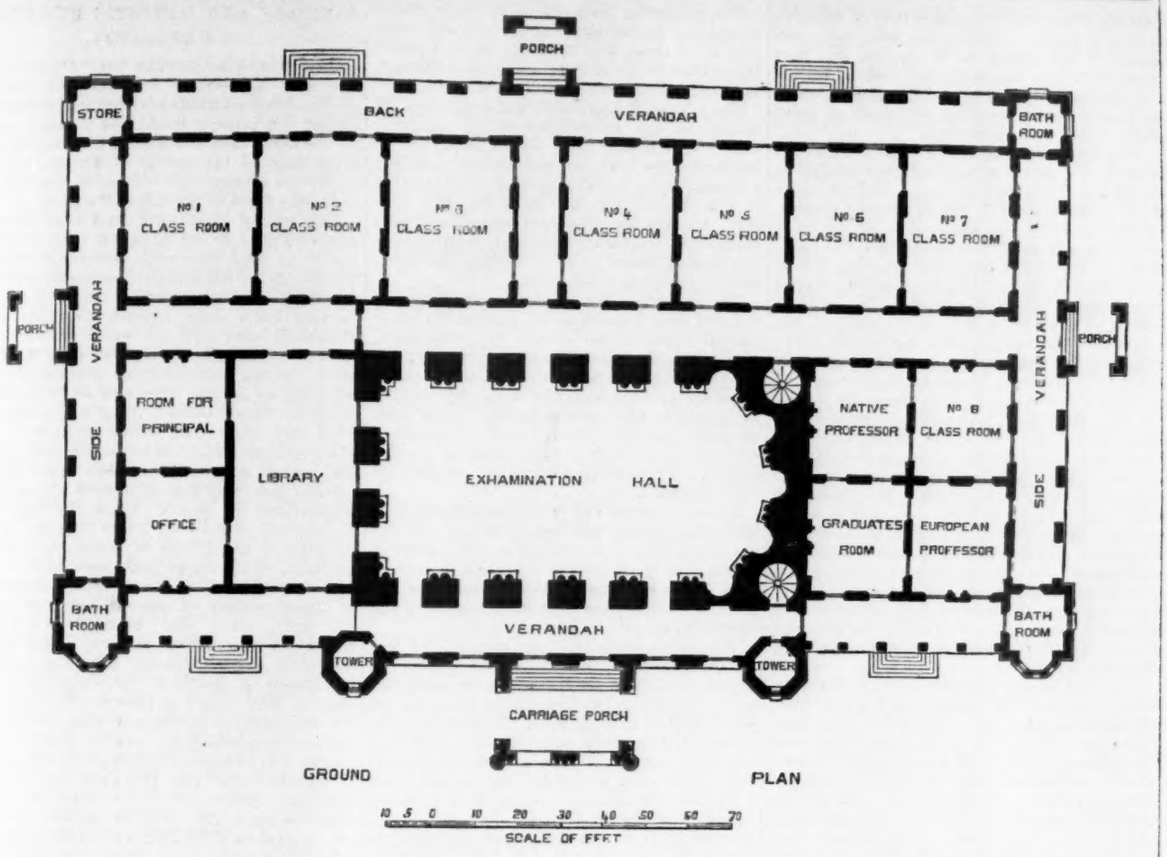
Wyman & Sons Printers, 74 Queen St.

HOUSES AT WALMER, KENT.—Mr. James Neale, Architect.



Whiteman & Bass. *Photo-Litho* 236, High Holborn. Wyman & Sons, Printers, 74 Queen St.

BANK AT BLACKPOOL, LANCASHIRE.—Messrs. Mills & Murgatroyd, Architects.



CANNING COLLEGE, LUCKNOW.—*Plan of Ground Floor.*

BANK AT BLACKPOOL, LANCASHIRE.

THESE premises are being erected for the purposes of a branch bank at the great Lancashire watering-place, for the Manchester and County Bank (Limited). As there is no residence attached, the architects, Messrs. Mills & Murgatroyd, of Manchester, have sought to gain effect by height and by breadth of treatment. The exterior is faced with Longridge stone; the plinth, window-string, and door-casing being of polished Bessbrook granite. The windows are of exceptional size, and will be glazed with polished plate-glass in ornamental metal frames set in the stonework. The interior will be finished, so far as the joinery is concerned, with pitch pine. A panelled wall lining of that material, with cornice will be carried round the walls for a height of 7 ft. 6 in., concealing the entrances to the strong room, cellar stairs, private office, &c.; the walls above that will be panelled in plaster, and the ceiling will also be in pitch pine worked up with a hexagonal shape, so as to conceal the want of rectangularity in the site. The basement will be occupied by clerks' lavatories, spare book-rooms, &c. The main frontage is 45 ft. long, and the height to the top of the main cornice, 36 ft. Messrs. Cooper & Tullis, of Preston, are the contractors for the whole of the work; the Albion Sawmill Company, of Fleetwood, executing the joiner's work for them.

CANNING COLLEGE, LUCKNOW.

THE paper read at the Royal Institute of British Architects last Monday, and the important discussion which followed, have made the buildings lately erected in India the subject of conversation during the week in many quarters. We take the opportunity to give a view and plan of one of them, completed not very long ago,—the Canning College, in Lucknow. This building, named in honour of the late Lord Canning, was built at the expense of the Talnqdars of Oudh as a place of education for their sons and for the sons of other high-class natives.

The fonndation-stone was laid on the 13th of November, 1867, by Sir John Lawrence, the then Governor-General; the usual coins, &c., were placed in the stone, which is situated under the floor of the tower on the west side of the front portico. The design first accepted in 1866 was subsequently rejected, and fresh designs were invited. The design ultimately accepted and carried out was prepared by Tika Ram, head draughtsman in the office of the Engineer-in-Chief, Rajputana State Railway. The main features of the design have been adhered to, but owing to the designer not having supplied detailed working drawings, and from other causes, many alterations have been made in the construction.

The accommodation provided consists of an examination-hall, 95 ft. by 45 ft. (the original length having been reduced by 5 ft. to allow of the east end wall being thickened to act as an efficient abutment to the elliptical portion of the arched roof), a library, 51 ft. 6 in. by 29 ft., and two rooms, 24 ft. 9 in. by 23 ft. 6 in., for the principal and office; on the east of the examination-hall there are two rooms, 22 ft. 6 in. by 24 ft. 9 in., for native professors and graduates, and two rooms, 23 ft. by 24 ft. 9 in., one for European professors, the other for a class-room; on the north side of the central corridor, there are seven class-rooms, two 29 ft. 4 in. by 35 ft. 6 in., one 29 ft. 1 in. by 35 ft. 6 in., and four 25 ft. 5½ in. by 35 ft. 6 in.; there are also two corner rooms, 11 ft. by 11 ft., and two 13 ft. by 13 ft., and two small octagonal rooms in the front towers. The work was completed in 1879.

The soil on which the building stands was found to consist of some 2 ft. of rubbish, the remains of the former old buildings, and below that of sand; the foundations throughout the building are carried down to a depth of 8 ft.; the lower 7 ft., consist of concrete composed of sixty-five parts of brick ballast, twenty-one parts of surkhi, and fourteen parts of kankar lime, the lime for this and the whole of the work being burned on the spot. The concrete, after being thoroughly mixed on the platform, was spread in 6-inch layers, and rammed with ordinary iron rammers till quite hard. The brickwork is set in English bond, in mortar composed of equal parts of fresh kanker lime and surkhi.

The plinth is 4 ft. 6 in. high, and inverts are given under the arches of the examination-hall to equalise the pressure on the foundations. On the top of the plinth a damp-course of asphalte, ½ in. thick, was laid.

The superstructure, which, with the exceptions hereafter mentioned, is entirely of brickwork, was carried up evenly throughout the whole building, and kept thoroughly wet until completed.

The roofs of the upper and lower verandahs and corridors consist of segmental arches of 9 ft. span and 2 ft. 6 in. versine; the span of the arch is made less than the width of the verandah by bringing the arch forward on to the cornice; the arches are 9 in. thick, and the spandrels, up to the level of the extrados, are filled in with concrete composed as for foundations; the thrust of the arch is taken by wrought-iron bars, each 3 in. by ¾ in., tied together at 8 ft. intervals by bolts 1 in. in diameter.

The roofs of the library and all rooms except the examination-hall and turrets, are of brick arches, turned between girders; the arches are 4½ in. thick at the crown, and 9 in. at the haunches; the spandrels up to the level of the top of the girders are filled in with concrete composed as for foundations, and the whole of the outer roofs are covered with a layer of "terrace," having a good slope outwards; the finished thickness of terrace averages 4½ in., and is composed of four parts brick-ballast and coarse surkhi, and one of fresh lime; these materials were thoroughly mixed and spread on the roof to the required thickness, then beaten till quite hard; a layer of fine mortar mixed with gur was then given, and the whole surface finished off by being well rubbed over with castor-oil.

The girders for these roofs are entirely of wrought-iron, and were made on the spot. For the library and three largest class-rooms they are 2 ft. deep, with webs ¼ in. thick and flanges of double 4 in. by 4 in. by ¾ in. L-irons; for other rooms they are 2 ft. deep, with webs ¼ in. thick, and flanges of double 3 in. by 3 in. by ¼ in. L-irons; for small porches they are 15 in. deep, with ¼ in. webs, and flanges of double 2 in. by 2 in. by ¼ in. L-irons; the girders are designed so that the load on them induces a strain on the flanges of

less than five tons per square inch of effective section: where necessary to withstand the thrust of end arches, as in porches, &c., bars were built into the walls and secured to the nearest girder by iron bolts. The girders, bolts, and all ironwork, received two coats of paint before being fixed in position.

The library roof in the original design was arched, and caused a very unsightly projection in the line of the front parapet. The alteration from a single arch to arches between girders, while improving the appearance of the front elevation, necessitated some provision for lighting in place of the end circular lights; this is given by a skylight, 21 ft. 9 in. by 6 ft., placed in the centre of the library roof. To take the thrust of the roof arches at the ends of the space left for skylight, strut girders are given between the four centre main girders, with webs ¼ in. thick and flanges on one side only of 4 in. by 4 in. by ⅜ in. L-iron; these are riveted to main girders by L-irons 3½ in. by 3½ in. by ⅜ in. Round the top of the rectangular space thus formed and bolted to the top flanges of girders is a sill of sal-wood, 8 in. by 4 in., into which the uprights of skylight are fixed; the sides and ends of skylight have glazed sashes working on pivots. The roof, which is curved, is covered with 1 in. planks tongued and grooved, and painted with three coats of oil-paint, and over this corrugated iron carried well out over ends and sides. The inside of skylight and walls formed by main and strut girders are painted a dead white, and a very good light has been secured.

The roof of the examination-hall has been made elliptical throughout, the span of plain portion being 45 ft. and of ribs 43 ft. 6 in.; these latter are disposed in pairs immediately over Corinthian pilasters. The east end of the roof, which is elliptical in plan, is domed to meet the straight portion. The whole of the arching springs at a height of 31 ft. 6 in. above floor-level, and has a versine of 15 ft. The thickness of plain portions of roof is 1 ft. 2½ in. at crown, increased to 1 ft. 10½ in. at haunches; where the ribs occur these dimensions are increased by 9 in.

The arch was built on a Hindustani centre, supported by pillars of brick-in-mud, placed about 8 ft. apart; the exterior of centre was worked roughly to shape and finished with lime-mortar, the true shape being obtained by use of templets made for the purpose; the arch was built in lengths of 15 ft., so that each joint comes between a pair of ribs. The whole roof was built and keyed in fifteen days. There was some little delay in getting the backing up to the required height, and the centreing was not wholly struck until some time after. Levels taken at 10 ft. intervals along the top of arch just after keying up and after centres were wholly struck, showed the maximum settlement to be 0·1 ft. and minimum 0·05 ft., the mean being 1⅛ in. In the straight portion of the roof the thrust is taken by 4 in. by 4 in. by ⅜ in. L-irons, placed 6 ft. above springing and connected by tie-rods 1¼ in. diameter, placed 7 ft. 6 in. apart. The spandrels are filled with concrete as for foundations, and a 3 in. layer of terrace is given over the whole.

The floors throughout the building are of Mirzapore stone slabs, set in 2 in. of lime-mortar over brick rubbish carefully rammed.

The central rectangular and corner turrets have Mirzapore stone pillars and lintels; the arches between the pillars are cut in 4 in. stones, which are let 2 in. into both pillars and lintels; the joints are set in fine lime-mortar, and the lintel stones are held firmly together by iron cramps run in with sulphur; the pillar-bases and caps are secured by vertical iron dowels, also run in with sulphur. The roofs and work above lintels is entirely of first-class brickwork; in rectangular turret the roof is a semicircular arch, 1 ft. 2 in. thick, and the corner turrets are domed thrust-bands of 4 in. by ⅜ in. iron, being built in at a height of 2 ft. 6 in. above springing; round these corner turrets there are projecting balconies supported on stone brackets 2 in. thick; these brackets project 4 ft., and are built 2 ft. into the wall. There is no weight on the portion built in except the stone flagging, so, to prevent any chance of tilting, an iron rod, ¾ in. diameter, was passed through them all at the centre of their depth, and at a distance of 1 ft. 6 in. in from the face of the wall: this rod is embedded in brickwork, which comes up flush with the tops of the brackets.

The two small turrets in front and the four minarets are entirely in brickwork.

The projecting windows in the front corner towers are carried by brick corbels, and a capping sill of stone, 6 in. thick cut, to the shape of the window on the outside and carried through, so as to be flush with inside face of wall.

The whole building inside and out, except the interior of the examination-hall, is plastered with a thin coat of sand plaster, composed of one part stone lime, one part kankar lime, and two parts clean Goomtee sand, ground together in a mortar-mill and laid on in the usual manner. All mouldings and ornamental work were executed in brickwork as closely as possible to the finished shape, so as to reduce the thickness of plaster to a minimum.

The exterior of the building and interior of end and back verandahs and porches are left of natural colour of the plaster, the ornamental work having a ground of pale neutral tint; the class and other rooms, except examination-hall, are coloured light blue, the roofs and cornices being white; the central corridor, lower front verandah, and both upper verandahs are entirely white, so as to throw as much light as possible into the examination-hall, which receives its light through them.

The examination-hall is plastered throughout with white plaster polished to imitate marble; the rough coat is composed of equal parts of surkhi and fresh kankar lime, this is covered with a thin coat composed of white lime and powdered Jubbulpore soap-stone worked in and rubbed up to a fine polish.

The upper verandahs are reached by two spiral staircases formed in the east end wall of examination-hall; they are 9 ft. in diameter, with a newel 1 ft. 6 in. in diameter, giving a clear width of step of 3 ft. 9 in. The centre width of tread is 1 ft. 2½ in., and rise 8 in. The steps and risers are of Mirzapore stone, the former 4 in. thick with a moulded nosing, the latter 2 in.; the south staircase is continued up to the roof of the examination-hall, its outlet being covered by an arched roof, which is carried up spirally from a point 1 ft. 6 in. below roof level, the staircase door opens on to the roof behind the turret on the east side of front portico, which hides it from the front, while it is hidden from the east by the parapet which at this point is 4 ft. 6 in. high.

The doors and windows throughout the building are of teak, fixed in teak chowkuts; these latter are not built into the walls, but fitted accurately to the openings in the brickwork and secured by screws to dovetailed bricks of sal wood, which were, after being soaked in tar, built into the walls. In addition to the glazed or panel doors, all outer doorways are fitted with teak Venetians.

The arches in room over front porch, and also the front doors of upper front verandah, are fitted with ornamental cast-iron railings with teak top and bottom rails.

Ventilation is provided in examination-hall by holes left at the soffit of the arch between each pair of ribs; it is provided in a similar manner for the long verandahs and corridors, and in rooms by openings in the ends of roof arches, which are carried up the end walls. All openings are covered by suitable caps to prevent the entrance of rain.

Polished brass finials are given to turrets, minarets, and the projecting windows of corner towers.

There is no woodwork in the whole building except the doors, chowkuts, and library skylight.

The general effect of the exterior must be regarded as very poor. The style, as the designer stated, is in harmony with the surrounding buildings of the Kaiser Bagh, — a bad standard.

The total cost of the building was Rs. 1,73,299, or Rs. 5 per square foot of plinth area. It was almost exactly two years in construction.

THE ST. GOTHARD TUNNEL.

It is stated in the foreign press that the service of trains through the Gothard Tunnel, commencing on the 1st of January, will include three daily communications from the Swiss to the Italian side. Two of these will be in connexion with through-trains from Lucerne to Milan. The saving of time will, according to present arrangements, be about four or five hours, as compared with the mountain route hitherto traversed, the journey from Lucerne to Milan being arranged to take about twenty-two hours.

SANITARY AND DOMESTIC EXHIBITION AT BRIGHTON.

On Monday afternoon last the "Domestic and Scientific Exhibition," in connexion with the Health Congress which has been held at Brighton during the present week, was formally opened by the Right Hon. the Earl of Chichester, Lord-Lieutenant of the county of Sussex, who presided over a large and influential meeting held under the dome of the Royal Pavilion.

The Earl of Chichester said that while he was very glad to see the great interest which was being most deservedly taken in all matters that concerned the health of towns and cities, he was afraid that some persons who lived in towns thought that a country gentleman's house smelt of nothing but violets and wallflowers. He was sorry to say that, in his experience, he had found many country mansions and parsonage-houses pervaded by as foul odours as any that existed in the courts and alleys of some towns, and supplied very often with worse water than was procurable in towns. It was satisfactory to note that great progress had been made during recent years in all that concerned the adoption of securities for health. Since the time when all England was on its knees praying for the recovery of the Prince of Wales, the sanitary condition of dwellings had been more closely looked into, and a great many discoveries of latent sources of disease had been made, and very much had been done in providing for the better sewerage and water-supply of towns. He did not think that the inhabitants of Brighton had anything to complain of with regard to their water-supply, and the authorities had made a very magnificent main sewer, which he trusted would be so managed as to be no nuisance to the inhabitants. In ancient Rome there was a goddess who presided over drains, and if the mayor could only persuade some fair lady to preside over the *cloaca maxima* of Brighton, so as to secure the inhabitants against any unpleasant exhalations from it, he would immortalise his name. He trusted that the exhibition which they had met to open, exemplifying as it did the application of scientific principles to the preservation of health, would be of great benefit not only to the town, but to the nation at large.

The Mayor of Brighton (Mr. W. H. Hallett), having explained in detail the circumstances which had led to the proposal for holding a health congress in the town, supplemented by an exhibition of sanitary and domestic appliances, said that he thought the health congress would be one of the most successful gatherings of the kind ever held, for up to that time,—which was some thirty hours before the congress would commence,—773 persons had taken tickets. The merit of originating the exhibition, which he thought would be pronounced by everybody who saw it to be a very good one, was due to Councillor Hamilton, who had been indefatigable in its organisation.

The Right Hon. the Speaker said that perhaps he might be allowed to tender himself as a witness to the fact that one of the best prescriptions for health was hard work. The age in which we lived had been very properly called the age of great cities. London was a gigantic city, having a population which was increasing in a most prodigious manner, as, indeed, might be said of the population of the country at large, the increase being at the rate of about a thousand souls per day. That increase was mainly in the great cities and towns, and it therefore behoved the authorities of the great cities and towns to see that the health of the population was maintained, because if it were not maintained the people would degenerate in stamina and become dwarfed both in body and mind. He was very glad to think that Brighton was setting a good example to other towns, but although much had been done to maintain the health of Brighton, much more remained to be done. He was old enough to remember Brighton when it was very little more than a large village; now it was an immense town. As it grew in numbers and extent evils came upon it which should be promptly dealt with. He observed very frequently hanging over the town a smoke-cloud. That was likely to become a very serious matter for the people of Brighton to deal with, and he should be glad to think that one result of the conference and exhibition would be that it should lead them to grapple with the smoke nuisance. The larger the town became, the worse would be the nuisance, which in London was becoming intolerable. There was another

matter which he might be permitted to advert to. In all large towns and cities open spaces for the circulation of air and for the enjoyment of the citizens were very essential. He had heard a whisper about a park for Brighton. He did not know what the authorities of the town proposed to do with regard to the proposal, but he trusted that the congress would give the subject a lift.

Mr. Hollond, M.P., having made a few remarks, the Earl of Chichester, accompanied by the Bishop of Chichester, the Mayor of Brighton, Dr. Richardson, Mr. Hollond, Sir Henry Cole, Mr. Edwin Chadwick, Mr. Hamilton, and other gentlemen who occupied the platform, followed by the remainder of the large audience, adjourned to the Exhibition, which is a very large and good one, occupying, not only the Corn Exchange, but an extensive range of corrugated iron buildings in the Pavilion grounds. These temporary buildings have been erected by Mr. J. Charlton Humphreys, of the Ludgate Station Roofing Works, New Bridge-street, in rather less than three weeks. This, from the extent and position of the buildings, is certainly a feat in construction. In order not to interfere with the Pavilion grounds, which have a very undulating surface, the buildings are carried on wooden sleeper walls extending to a height of from 6 in. to between 5 ft. and 6 ft. above the surface of the ground. The two main buildings (which are connected together and with the Corn Exchange by two or three smaller structures) measure, the one 200 ft. in length by 40 ft. in width by 25 ft. in height to apex of roof trusses (which are of timber), and the other 280 ft. in length by 32 ft. in width, by 14 ft. to the apex. Longitudinal sleepers 9 in. by 4 in. carry the joists, 7 in. by 2½ in., the flooring being of 8 in. by 2 in. planks.* The buildings are illuminated by the electric light, two systems being employed, viz., the "Brush" and the British Electric Light Company's system, the engines and dynamo-electric machines being located in one of the temporary iron buildings, which also include a small hospital room, in which beds and other appliances used in hospital wards are shown by some five or six London hospitals.

The Exhibition is divided into eight classes, including Food Products, Labour-saving and Educational Appliances, House Sanitation, Electricity as applied to lighting and other purposes, Decorative Art, Horological and Meteorological Instruments, and a loan collection of works of art from South Kensington. In Classes III. and IV., House Sanitation (including ventilating and heating, drainage, baths, water and other closets and fittings, filters, and plans and models of cottages and industrial dwellings), there is a very good display of useful appliances, including a few novelties; while in Class VI., Decorative Art, are several exhibits well worthy of attention. The catalogue is very imperfect in some respects, and as the classification adopted is not strictly adhered to, we propose to notice such of the exhibits as are of more especial interest to our readers in the order in which the stands are numbered, beginning in the Corn Exchange with Stand 34, where Messrs. Hannington & Sons, of Brighton, exhibit a well-made suite of drawing-room furniture, including chimney-piece, made of rosewood, and in the style of Louis Seize. At Stand 35, Mr. Russell R. Perry, of Brighton, has a very good display of muralis, raised flock, and imitation stamped leather, velvet, and silk wall-papers, most of the latter very rich in effect, and of French design and manufacture. They are also exhibitors of parquetry for floors and dados. Messrs. Sendall & Son, of Brighton (Stand 36), exhibit a number of specimens of painted imitations of woods and marbles. These include some of the best work of the kind we have ever seen. Messrs. W. Woollams & Co., of London, are exhibitors at Stand 37 of artistic wall-papers and dado decorations in great variety, all characterised by excellence of design and free from arsenical compounds. At Stand 68, Mr. H. J. Lanchester, architect, exhibits drawings showing the application of his patent waterproof facing bricks for use in exposed situations. They are stated to have been largely used in buildings on the South Coast, and to be made of the same material (terra-cotta) as used at the new Natural History Museum, South Kensington. Stands 69, 72, 74, 75, 76, 77, and 81 are devoted to architectural drawings, exhibited respectively by Messrs. Scott & Hyde, Mr. J. G. Gibbins, Messrs. Holford, Clayton, & Black, Mr. J. Pitt Bayly, Mr. Thomas W. Cutler, Mr. Somers Clarke, jun., and Mr. Rowland Plumbe. The domestic interiors shown by Mr. Cutler and Mr. Plumbe are very pleasing. Mr. Cutler also shows a set of drawings of the Princess Alice Memorial Cottage Hospital proposed to be erected at Eastbourne. Messrs. Lainson & Son exhibit drawings of the Royal Alexandra Hospital for Sick Children, Brighton. Stand 105 is that of Mr. George Alfred Rogers, of Maddox-street, Oxford-street, who displays some excellent specimens of wood carving. At Stand 107, Messrs. J. Rooke & Sons, of Brighton, exhibit a sculptured memorial cross in Sicilian marble, and some terra-cotta panels and capitals. Stand 108 is occupied by Messrs. Doulton & Co., who make a good display of Lambeth art pottery, in its varieties known as Doulton Ware, Lambeth Faïence, Impasto, Silicon, &c. They also exhibit some specimens of tile decorations. Stand 116 is that of the Albissima Paint Company, of whose sanitary paint we have on a former occasion spoken in terms of commendation. At Stand 117, Messrs. C. Feldwicke & Sons, of Brighton, are exhibitors of Chippendale and other furniture. Stand 124 is occupied by Messrs. Howard & Son, of Berners-street, with their parquet flooring. At Stand 133A the Mayor of Brighton (Mr. W. H. Hallett) is stated by the catalogue to exhibit "an effective and inexpensive apparatus for the softening of water from chalk, for domestic use," but we did not see it in the exhibition. At Stand 134, Mr. W. Botting is an exhibitor of a wash-out closet, and Dr. Churchill's "self-ventilating 'Disjuncta' closet." The North of England School Furnishing Company, Darlington, show Dr. Roth's adjustable seats and desks for school purposes, and, among other useful and convenient appliances, the "Kensington Art Table," very handy for drawing. Mr. Christopher Hill, Brighton (Stand 164), shows his patent arch fire-bars as applied to steam boiler-furnaces, and a kitchener with a set of patent inclined fire-bars. Messrs. Thomas Bradford & Co. (Stand 167) are exhibitors of washing-machines and other laundry appliances and fittings, and they also exhibit plans of large laundries fitted up by them. At Stand 171, Messrs. Barford & Perkins, of Peterborough, exhibit their steam-cooking apparatus, as used at workhouses and other large institutions. Messrs. Frederick Edwards & Son, of Great Marlborough-street, London, show, at Stand 172, their smoke-consuming slow-combustion grates, and a kitchener. Gas stoves and fittings are shown in great abundance by, among other firms, Messrs. W. Sugg & Co. (Stand 175), who exhibit some well-designed brass chandeliers and brackets in the "Queen Anne" and other modes. At Stand 177, Messrs. Doulton & Co. show their radiating tile slow-combustion warm-air stoves, and they have on view a good assortment of architectural and sanitary pottery. Among the latter class of goods we may direct attention to their new patent joint for stoneware drain-pipes. This joint is not on the spigot and socket principle. Each length of pipe is alike at both ends, which are ground quite smooth and true by machinery, and butt against each other when laid. About 1 in. from each end of each pipe a collar or fillet is moulded on the exterior of the pipe, so that when the ground edges of the ends of the pipes are brought together a space or hollow of about 2 in. in width by 1 in. in depth is left between the collar of one pipe and that of the pipe next to it, the ground butt-joint being in the middle of this space. The pipes are laid with the ground surfaces well together in stoneware chairs made for the purpose, in which they are keyed or wedged up, and the hollows of the chairs filled up with liquid Portland cement, the space on the upper half of the pipes between the collars or fillets being also filled in with cement. It is claimed that this method of laying stoneware drain-pipes secures an absolutely watertight and immovable joint. This firm also exhibit their automatic flushing-tank, their patent tank filter, and Mr. Bailey-Denton's aërating water-filter, besides lavatories, water-closets, and sanitary fittings of all kinds. Visitors to Messrs. Doulton's stand should look at Cutler & Chapman's patent syphon-action water-waste-preventing cisterns, in which the syphon is set in action by the pneumatic action of bellows placed beneath the seat of the closet, and connected with the handle or pull. Messrs. C. G. Reed & Son, of Brighton (Stand 183), show stoves and grates of all kinds, including the "Wharncliffe" and slow-combustion stoves of Messrs. Steel & Garland, for whom Messrs. Reed are agents. At Stand 184, Mr. J. H. Gardner, of West Brighton, has a large display of chimney-pieces, stoves, grates, kitcheners, sanitary pottery, brick and tile goods, and other materials constituting the stock-in-trade of a builders' general merchant. Mr. Uriah Clark, of Hellingly, Sussex, shows at Stand 185, a variety of fancy ridge tiles and finials, besides terra-cotta and stoneware goods. Messrs. Henry Sharp, Jones & Co., of Poole, Dorset, exhibit (Stand 186), their rock-concrete tubes of large size for the construction of main sewers, and they show that these pipes are capable of being cut into for the purpose of connecting house-drains with them. Among the stoneware goods shown by this firm we may name their double-trapped and other gullies, and their soil-pipe disconnector. At Stand 187, Messrs. R. & N. Norman, of Burgess Hill, Sussex, are exhibitors of red facing and moulded bricks, paving bricks, tiles, cresting, and other goods of the kind. Messrs. Hayward Bros. & Eckstein, of Union-street, Borough (Stand 188), exhibit their patent semi-prismatic pavement and floor-lights and safety coal-hole plates. At the next Stand, 189, Messrs. Charles Drake & Co. (Limited), of Battersea, exhibit some very good things in their marble-concrete, including a bath, some steps and pavement, and a chimney-piece. Messrs. Sherwood & Streeter, of Brighton (Stand 190), exhibit the Antiseptic Company's simple appliance for deodorising pan and other closets. At Stand 192 Mr. T. H. Tuxford, of Brighton, exhibits ⊐-traps of improved form, and a wash-out closet-basin and trap combined, in one piece of earthenware, with outlet at the front. Messrs. Hodges, Butler, & Dale, of East Greenwich (Stand 194) show their "Imperial" silicated stone in some of its varied applications; for instance, they show sinks, baths, egg-shaped and cylindrical pipes of large dimensions for sewers, and paving, all made of this useful material. At Stand 196 Mr. Alfred Bedborough, architect, London, shows the patent "Imperial" sash-window. By lowering the top sash of the window a free vertical current of air is introduced into the apartment between the glass of the top and bottom sashes. This is effected by the frome and sashes being made so much higher than the window opening. Thus, the head of the frame will be 12 in. (more or less as desired) above the soffit of the window opening. The top sash is, therefore, constructed in height (say) 12 in. longer than the bottom sash. The sashes, though constructed as ordinary sliding-sashes, are capable of being opened on centres and inclined to any required angle so as to be cleaned from the inside. Messrs. John Bazley White & Bros., of London, exhibit (Stand 197) samples of Portland cement. The Eureka Concrete Company, of Leeds (Stand 198), show culverts, lintels, steps, sinks, and fire-proof flooring made of their material. Dr. P. Hinckes Bird, of London (Stand 200), shows three models of his unpatented costless method of ventilation, the details of which we published in the *Builder* some years ago. Dr. Hinckes Bird's method of securing draughtless ventilation with the use of common window-sashes is worthy of the attention of visitors to the exhibition, as it is exceedingly simple and can be adopted by anybody. At Stand 204, Messrs. S. & E. Ransome & Co., of London, exhibit their patent solutions for the prevention of damp walls, and for preventing the decay of stone. The Water Reform Company (Limited), of London, show (Stand 205) Atkins's patent rotary filter (described by us some time ago), together with drawings illustrating their process for the softening and purification of water. The Ladies' Sanitary Association, of 22, Berners-street, Oxford-street, display at Stand 206 a number of their useful little sanitary tracts and publications. At Stand 214, Messrs. C. Kite & Co. exhibit their patent "Albert" chimney-caps and their exhaust ventilators for cow-houses, stables, &c., which have been extensively used in London. At Stand 217 Messrs. Banner Bros. & Co., of London, exhibit drawings and models fully illustrating their system of sanitation, the merits of which are so well known to our readers that we need only mention it. Messrs. Robert Boyle & Son, of London and Glasgow (Stand 219), show their well-known air-pump ventilators in various forms and sizes, from those of the small cowl to those of the large *flèche* or turret of architectural character. At Stand 235, Messrs. Hay-

*As announced in our advertising columns, these buildings are to be sold by Messrs. Horne & Everefield at the close of the exhibition.

ward Tyler & Co., of London, show their new patent "full-flush valveless closet," of which we have spoken well on a previous occasion. Stand 226 is occupied by Messrs. Thos. Waller & Co., of Fish-street-hill and Southwark, who show hydraulic and other dinner-lifts; grilling and other cooking apparatus; a 9 ft. 6 in. cooking-range, with three boilers and two ovens, all heated by one small fire; a very useful steam-chest, and other appliances needed in the kitchens of large hotels, club-houses, &c. A welded iron boiler shown at this stand is a *tour de force* in its way. Messrs. Waller's patent ventilated water-closet should be looked at. At Stand 230 Mr. F. G. Underhay exhibits valve-closets and water-fittings in variety, and of excellent manufacture. His registered lavatory basin-valve is simple and good, and discharges very quickly. Another good thing shown at this stand is Law & Underhay's patent double-cylinder water-meter. It consists of two pistons working in two cylinders, which pistons give motion to two cranks fixed at right angles to each other at opposite extremities of the same shaft. The fluid to be measured is admitted successively to the upper and lower extremities of the cylinders by a rotary valve upon the crank shaft. The pressure of the fluid gives motion to the piston, causing the crank shaft to revolve continuously in one direction, and the quantity of fluid which passes is registered by a counting apparatus, which exhibits the number of revolutions made by the crank shaft, each revolution discharging a quantity of water equal to four times the contents of the cylinder. The meter is, in fact, constructed on the principle of a double-acting steam-engine, and is capable of being used as a motor. At Stand 232, Mr. George Jennings, of Stangate, has some interesting exhibits, including a new system of speaking-tubes, in which a branch tube from any room in a house can be led into a main or trunk tube (just as gas-pipes can be carried up and branched off anywhere), and made to "speak" in any other room, an ingenious arrangement of valves worked by electricity rendering it possible to shut off all other portions of the system of tubing from the portion through which it is desired to speak. Mr. Jennings shows water-closets and fittings, and his tip-up lavatories,—the latter greatly improved by the use of trunnions, which allow of the basin being instantly removed for the purpose of cleansing the space beneath it. Mr. Jennings also exhibits a new quick-filling water-waste-preventing cistern. At Stand 236, Mr. D. T. Bostel, of Brighton, shows his "Excelsior" wash-out closet, and, among many other things, Holt's patent automatic flushing-cisterns, which should be looked at by visitors. At Stand 242, Messrs. Meakin & Co., of Baker-street, show their sash-fasteners and -openers. Among other exhibitors are the Improved Industrial Dwellings Company and the Artisans', Labourers', and General Dwellings Company, who exhibit plans of some of their buildings erected in London. It is stated that the number of dwellings erected by the first-named company is 4,135, accommodating about 20,000 inhabitants, at an expenditure, to date, of 745,000*l.*

The exhibition, as at present arranged, will remain open until Wednesday next, the 21st.

THE SEED-TIME OF HEALTH.*

In the depths of the night, in a climate where night is short; in the midst of that short interval, when even the gods are supposed to rest; when the sun-god himself has withdrawn from the earth, and the sun sees not the deeds of men, some men and women of the earth, in solemn silence, bring something forth from home. If they should speak, there would flow from the lips of those people a language so beautiful, so perfect, so expressive, that though the listening ear were foreign to it and understood it not, it would be held listening. But there is not a sound. If these people could be seen in their fair stature and build of body, draped in their loose garments, the eye, like the ear, would be vanquished. Such incomparable beauty! Should a sculptor want a model for a work he would leave for all time, he would find it in them: should a painter want a face for his perfected art, he would find it in them; should a poet want the theme for a song on living beauty, he would find his inspiration in them; should a physician want a text for a discourse on the types of health and sanity, he would find it in those types of beauty. In those faces, which actually live to this hour in marble more precious than gold, there would be seen, if they were unveiled from this awful stillness and darkness of the night, two living passions, engraved in life through expression of the soul, resigned grief and sublime fear. What has happened can never be recalled, and grief, therefore, is chastened by reason; but what has happened is so unnatural, so wrong, that reason, in its turn, is sublimed to fear. It is so terrible, none must look on it; if the sun-god, source of of light and life, should see it, he might hide his face and punish all the races of mankind. Well may there sit on every face the chaste beauty of resignation and sublimity of fear!

What can have happened?

There is something that is being carried tenderly, awfully! It is a casket, small and light. It might be a cradle or a cot supporting some object of tender solicitude. A child! yes, a child in all its childish wealth, its golden tresses on its pillow, its features divinely fair and spiritual, its limbs the ideal of grace. Surely in the dead of this night it sleeps, and they are taking it to some golden coast, where in the morning it will greet the sun, lave in the azure sea, listen to the shell picked up by the shore for the mysterious music, and bask in pleasure. Alas! no. As the earth is now dead and silent, its soul of sun withdrawn, so is the soul of that human lovely form; and as the earth is proceeding to enter once more the eternal fire that at once animates and destroys it, so this child of earth is being carried to the pyre.

Beyond expression terrible this event, that they, the bearers and followers, should be so ignorant as to let such beaming beauty die. Had it lived its course, played its mortal part, and like the ripe grain fallen fairly under the sickle of the Immortal Reaper, then, though a thousand suns had shone, the event had been natural, honourable. Then this ceremonial had been public as the day. Tears might have moistened the eye of the lookers-on, but there would be no shame; the deeds of the dead might be themes of honour, or fame, or joy; but shame, no trace of it. The shame is now; the shame that must be hidden in darkness of darkness, as a crime against knowledge, and love, and family, and country, and time! the shame that life in its earliest dawn should be let go, and run no Olympian game, and sing no song, and tell no history, and plant no work of art, and hold no standard, and fulfil no task of duty! They veil themselves from the truth that they may awake as from a deathly dream. Let them pass from us also as a dream.

Yet the dream is true, for I have embodied in these sentences an idea of mankind in that period of human history when, as by a miracle, the human soul burst into the flame which to this day is our great source of intellectual light; the flame that in its own home went out, but from which, while it burned, all the world lighted a torch and carried it away.

While the sculptor of to-day still strikes a light from the dead of that period of intellectual glory, from the very marble into which its fervid life was infused for ever, let us who deal with actual life strike a light from the sentiment regarding the young who fell as they were rising from the drowsy torpor of infancy into the waking dreams of adolescence, instead of passing in natural course through manhood or womanhood, towards maturity, towards drowsy decline.

These wise people knew that life ought to be a perpetual feast. They not only knew the fact, they acted up to it. They were equally well aware that a long and perfect life could alone be attained by perfection of life at its opening, in the seed-time of health. To die at that time was, therefore, an offence against natural rule, against reason, against sentiment. The knowledge of such an event was death to the brain, death to the heart. In this seed-time of health the life was to be made, the life that was to be in truth a life worth living. Animals beneath men, that are worthy of going through their appointed time, and of being made both useful and beautiful, must have their seed-time of health. Shall their human masters be less cared for? If the masters are to be mere slaves, yes; and then it were a pity and a danger; for they who have no respect for life and beauty, who drag through existence and grow weary of it, are to be trusted neither with life, beauty, nor fame.

In the history of great truths derived from the Hellenic wise times, there is not one truth so great as this, and not one so completely missed. It is the secret that was lost. In our day we have lost it so severely that it might never have been in existence for aught we seem to care. The key to all we would have, the key to the gates of health and happiness, has been lost as if it had never been found.

In point of health our children in these times, proud as we are of these times, are our reproach. Where is there a healthy child? I have never seen one. I might search through the length and breadth of the island, I could not find one. You may put before me a child in all its innocence. It has done no wrong that it should suffer; it may show to the unskilled mind no trace of disease; and yet I know that if I or any skilled observer were to look into the history of the life in question it cannot be found intrinsically sound. It will have to battle with future dangers sufficient for the soundest to meet; but it is not itself free from dangers other than those that are prospective and avoidable. It is sure to have some inherited failure, and too likely some that will help to increase the independent risks that lie before it. So our children under five years are expected to die in what may almost be called a definite proportion. He is a fortunate man who, having four children born to him, retains three alive. Later on, for a short time, the danger is reduced; with adolescence it recurs. Again it retreats, but with such failure all along the line, that one-third of the allotted life, the life that would be were it planted in sound health, is only attained.

And for this we have no shame. The sun, the moon, and all the stars may witness our miseries, and we may grieve, but we have no shame. There is an assembly of learned men which I sometimes visit, an assembly of earnest men who are bent on understanding to the full these human failures from health. These men spare no pains, and to gain a spark of light will labour like miners in a mine. When last I visited them a puny feeble spark of life was in their presence undergoing their searching yet kindly scrutiny. Except that it cried a little and laughed a little in changing mood, this spark of life might have been considered a pathological specimen, and in truth it was discussed as such. No one there had a thought of that small life developing into wholesome life and passing through its natural term; not one was there who did not know that the chances of bare life were impossible, and that nothing could be done to save it. The intent was to study the pathology, and fix that by name. They said, when their technical language was translated, this child is suffering from the error, some would say the sin, of its parents. How deep did this error go? In what strange forms did it appear? How singular that the nervous system, once impressed with the poison of that error, should impress another nervous system, and so modify the nutrition of the organism to which it belonged as to cause false nutrition of internal organs and of the very bones themselves! In a whisper one of the learned expressed to another one the pity "that such a specimen of humanity should ever have been born, to breathe and take notice, and smile, and cry, and love, and suffer, and die, and we able to do nothing for it except hope for the relief that should end in the earliest death."

I belong to a committee which takes under its care another class of sad childhood. The members of this community pass before us deaf and mute. We try to give them the power of intelligent converse by laborious and artificial means, and we do some good; but the train of sufferers passes by, and we know that full half are mute from the undeveloped brain; that they are practically lost to life. It is not that the one sense is lost, and thereby the means of expression by intelligible language; it is not even that the nervous organisation which ministers to intelligence is low: it is that these deficiencies are some of the outward signs of a general deterioration of body, and that there is scarcely a structure which the eye of science would recognise as moulded in health.

Passing from the sphere of general observation, from modified to destroyed vitality, I find more startling facts at hand. A short unpretending essay reached me not long ago, in which the writer, who in his too great modesty conceals his name, epitomises the facts he has collected

* From the inaugural address delivered before the Health Congress at Brighton, on the 13th of December, by Dr. Benj. W. Richardson, president.

respecting the attainment of maturity in peoples of different nations. He tells us that of ten children born in Norway a little over seven reached their twentieth year; that in England and in the United States of America somewhat less than seven reach that stage; that in France only five reach it; and in Ireland less than five. He tells us that in Norway, out of 10,000 born, rather more than one out of three reaches the age of seventy; in England one out of four; in the United States, if both sexes be computed, less than one out of four; in France, less than one out of eight; and in Ireland, less than one out of eleven. And, he adds this significant computation, based on what may be called the commercial view of the vital question. "In producing dead machinery the cost of all that is broken in the making is charged to the cost of that which is completed. If we estimate by this same rule the cost of rearing children to manhood, if we calculate up the number of years lived by those who fell, with the years of those who passed successfully to manhood, there would be found between the two extremes presented in Norway and Ireland,—both, be it observed, unnatural,—a loss of 120 per cent. greater in the first year of life, 75 per cent. greater in the first four years of life, and 120 per cent. greater in the years between the fifth and the twentieth, in Ireland than in Norway. In Norway the average length of life of the effective population is thirty-nine and rather more than a half years; in England, thirty-five and a half years; in France, not quite thirty-three years; and in Ireland, not quite twenty-nine years. Thus, again, comparing the best with the worst of a scale of vitality in which both are bad, in Norway, the proportion of the population that reaches twenty survives nearly forty years, or four-fifths of the effective period, to contribute to the wealth of the community; while in Ireland the same proportion survives less than twenty-nine years, or considerably under three-fifths of the effective period.

When we are sitting in the family circle, and are speaking of families that lie within our cognisance, we estimate in the most natural way the happiness of the families by the health they represent. We may thoughtlessly speak of other standards of measurement. We may for a moment dwell on the riches of the house; on the luxuries that are to be seen in it; on the influence which the owners of it might or do exercise in the social sphere, and such like sentiments. But, after all, these rest on health as the basis of the happiness. If one out of every two of the offspring of the favoured house have died, if some who have not died are mute to the world, or otherwise stricken, we soon fall into more thoughtful mood, and say that even this rich home is not a possible home for happy life. Pleasures there may be, happiness there cannot be.

How much worse the estimate of a family in which, together with the vital failures, there is the lack of all that is necessary to make the burthen of life endurable. The favoured in health and means wonder, when they think of it, how such unfavoured endure the life they live. In that sentiment no maudlin canker lies; it is as hard and as free from poetry as a mathematical problem; and for that reason a sentiment that, above every other, is persistantly preserved.

What is true of family circles is equally true of nations. Rest, quiet of nations, repose for cultivation of refined arts and sciences, happiness derived from healthy and vigorous minds and intended for healthy, vigorous, and wholesome purposes, there cannot be, when one in two of life can only reach maturity with a survival of three-fifths of effective population. In such a national family there is persistent mourning. It sits for ever in gloom; the blinds of its home are always drawn. It broods, it attributes, as all heart-stricken mourners do, the loss it has sustained to every imaginable and unimaginable cause. It thinks with incoherency; speaks now with hysteric grief, then with hysteric rage, and acts the same. In a word, it follows natural law. State physicians tender their remedies for such families of nations and call themselves curers, as if that could be cured which is Nature pursuing her merciless course towards her merciful dispensations, in correction of those who have outraged her.

I have named this discourse "The Seed-time of Health," and in the sentences foregone I have tried to strike a contrast, and thereby to give to sanitation a broader meaning as a practical science than is commonly connected with it as a system of details respecting ventilators, sewer-traps, and the like.

I want to point to health as the all in all to man; the gate of health leading to the truly good in politics, art, science, letters,—ay, and religion, not less than the least of everything. The strain of my argument is, that unless we make the early life of our children a seed-time of health; unless we, from the root of life, so change the conditions which now exist, all our other measures are practically valueless.

At this moment we have not, as a nation, got this notion set in our minds in such degree as even to accept it, basic as it is, as worthy of serious thought. We have no shame when our young fail and die. Grief we have, fond memories we have; but shame, none. We bury our young as if the act were natural, and erect memorials of it. We read obituaries of the young dead; we read the terrible obituaries of the registrars-general; we discuss in congresses like these the cost of young life; but the shame of the Greek touches us not. The knowledge of the troubles which flow from the lack of the shame reaches us not.

One bright Sunday morning I was in Dublin, in the Phœnix Park. A great crowd formed a vast ring, to the borders of which I made my way. A wrestling match! Men of different counties wrestling in deathly earnest, the lookers-on intent to terror. On not a face in that multitude, barring the faces of some four or five Cockneys, who had a car all to themselves, and grinned as foolishly as they chattered and chaffed, was there so much as a smile. The victors were approved, but not cheered. If this be sport, I felt, it is the strangest I ever knew since I read of Christian trying to be merry in the Castle of Giant Despair. In that same day I traversed the city to see authority armed to the teeth in utterly joyless open places. I visited an exhibition of pictures to experience the same sense of all-pervading oppression. I followed a crowd, and found myself one of another multitude going out of the city, until we reached a place where the members of that multitude were burying their dead; and as they swept by, the train of young dead that was carried in the sight of the sun to sleep in that resting-place was to me as appalling as it was revealing. It was like lightning in persistent discharge. Peace, progress, content, happiness, with this discharge of fearful facts in view! A fable! "As is the earthy," says the priest, "such are they also that are earthy"; and I knew that I had never understood the saying before.

It struck me for the first time as I witnessed this painful phenomenon that with so much young death there could no more be health in the body politic than in the body corporeal. We sanitarians are, however, only bound to treat of that which belongs to our own labours, and acknowledging the perils incident to early life, and it may be even recognising the shame of them, have before us the question of their prevention from its health side alone.

STEAM HEATING FOR TOWNS AND VILLAGES.

THE combination system of heating was described by Captain Galton, at the Society of Arts, on the 7th of December.

The reader said,—Mr. Holly, in the system of combined steam heating which is about to be described, has devised an arrangement of pipes, which he terms the atmospheric radiator, to enable the temperature of the pipes to be regulated. In the combination system of steam heating, the steam, when once it enters the house, becomes the property of the occupier of the house, and the condensed water does not return to the boiler; the steam for the radiators is taken out of the flow-pipe through a valve, regulated by a thermostat, so arranged as to open and close the valves, admitting steam to the radiators; this thermostat may be adjusted to operate to within ten degrees of temperature, so that the heat of a room may be automatically maintained at about the temperature desired. The steam is admitted at the top of the radiator, through the valves, in such quantity as is desired, the bottom being open; the amount of steam admitted is determined by the temperature which it is desired to maintain, and by the amount of radiating surface. Thus, if a moderate temperature is required, a little steam will be admitted to the upper portion of the tubes. The heat from this small quantity of steam will be rapidly diffused by the surface of the radiator through the air of the room, and the inlet valve can be so adjusted as to control the amount of steam admitted; by this means the temperature of the room may be maintained at any required degree. The advantages claimed for these radiators are economy of manufacture, and ease of graduating to all weather; they may be made of tin, or galvanised iron, of any required height and design. The steam and water of condensation give off all their heat, and there being no valve in the return-pipe, and no pressure, there is no cracking and spluttering noise, as in pressure radiators. The steam, after it has passed into these radiators, cools down and becomes water, and passes entirely away from the steam-pipes, to be applied to such other purposes as the house-owner desires, as will presently be explained. Thus, in the ordinary system of heating by steam, in use in houses in the United States, the steam circulates continually from the boiler to the radiator, and returns as condensed water to the boiler; whereas, in the combination system the steam does not circulate back to the boiler, but, after it has passed into the house, passes away as water. That is to say, the steam in this system is taken from a steam main, laid through the streets, just as gas or water is taken from a main, and the heat from the steam is consumed in the houses in such a manner as the owner of the house thinks fit. The following is the general arrangement of the system:—The boilers are placed in a convenient central situation. The results given by Mr. Holly of a series of experiments on several boilers in use by him, show that, at Lockport, he evaporated, on an average, from 6 lb. to 9·5 lb. of water per pound of coal; this, of course, is a matter greatly depending on the quality of the fuel. Mr. Holly speaks in high terms of the Murphy smokeless furnaces, with regard to which he says:—"The perfect combustion and consequent total abolition of smoke from bituminous coal, and relative economy in the production of steam, are not the only points of superiority, as its cleanliness, ease of management, and saving of labour, are almost equally important. The stoking of the boiler resolves itself merely into dumping the coal from cars into the bin above the fire-box in front of the boiler, and occasionally pulling it towards the feed. A little engine carries it into the coking-chamber, dumps it at the proper time on the grate-bars, and by means of levers moving the shake-bars to and fro, slowly clears the bars of ashes. The doors are never opened, and one attendant, without a fireman's skill, will manage a battery of six boilers worked by the same power." This arrangement of furnace appears to have some resemblance to the McDougall furnace in the Smoke Abatement Exhibition. From the boiler, the steam passes into the main-pipes and lateral or branch-pipes. These have been made of lap-welded wrought iron steam-pipes. They vary in size according to the duty they have to perform. The largest yet laid is stated to be 12 in. diameter. The maximum steam pressure would be 100 lb. per square inch; but the pipes are made to resist strains many times in excess of the maximum pressure to which they can be subjected, and they are carefully tested.

It is essential to guard against the condensation, for, unless steam can be transmitted to considerable distances without too great loss by condensation, all devices to use it in buildings, however ingenious, would, of course, be useless. Condensation being caused by the radiation of heat from the pipes, the object is to arrest the radiation, that is, to keep in the heat by inclosing the pipes in the best non-conducting material that is attainable and cheap enough. In order to effect this, the pipe is wound about, first, with asbestos, followed by hair felting, porous paper, manilla paper, finally thin strips of wood laid on lengthwise, and the whole fastened together by a copper wire wound spirally over all. This is thrust into a wooden log, bored to leave an intervening air-chamber between the pipe and the wood, and of sufficient size to leave from 3 in. to 5 in. of wood covering. The elasticity of the wrappings permits the free expansion and contraction of the pipe, irrespective of the wood log, which is securely anchored and made immovable. The whole is placed in a trench a short distance below the surface, without regard to frost. At the bottom of the trench is laid an earthen tile-drain, to carry off any earth moisture; and in order further to insure the continuous dryness of the wood log

enclosing the pipe, if desired, 1¼-in. plank is fastened around the log, leaving an air space, and the whole is dashed with coal tar, and covered with earth. Pipes prepared in the manner described have been tested, and it is stated that these tests show that condensation can be reduced to a point that renders the general transmission of steam not only practicable, but profitable; that is to say, that the loss of heat by condensation is under 2½ per cent. The only actual experiment of which particulars are given, does not furnish so high a result; this experiment was on 1,600 ft. of 3-in pipe, laid on a descending grade of about 1 in 250, the lower end trapped for water, the steam pressure constantly maintained at 20 lb. at both ends, during twelve hours; and the water of condensation, carefully weighed, amounting to 82 lb. per hour; i.e., about 1968 lb. of water per square foot of surface of pipe; that is, 66 units of heat per square foot per hour, or 52 units per foot run. The loss of heat from uncovered steam pipes, with steam of 40 lb. to 60 lb. pressure, may be assumed, probably, at something between 320 and 380 units of heat per square foot of surface, partly dependent upon the outside temperature. The Holly boilers in this experiment are stated to have evaporated 9 lb. of water per pound of coal. Therefore the extra coal required to keep up the loss from condensation amounted to 9 lb. of coal, or at the rate of 30 lb. of coal per hour per mile of 3-in. pipe. The actual amount of condensation in large pipes is greater than in small pipes, but the relative percentage per square foot of surface less than in small pipes. It is stated that from experiments and practice, verified in fifteen cities, the most economical pressure to be maintained in the mains, is from 40 lb. to 60 lb., although in some cities 70 lb. have been used. Experience with large mains is yet limited. The experience of Detroit demonstrates the fact that 60 lb. pressure could be maintained in four miles of 10-in. and 6-in. pipe, against the drafts for power and heat along the line.

In order to counteract the difficulty arising from the expansion and contraction of the pipes, which are subject to extremes of temperature, varying from, say 20° Fahrenheit, and the temperature of steam at, say 60 lb. pressure, i.e., 307° Fahrenheit, a junction and service box are used. These are placed at convenient intervals along the line, of 100 ft. to 200 ft. The arriving-pipe from the boilers is inserted in the service-box, by means of a nickle-plated extension, or telescopic joint, made steam-tight by passing through a stuffing-box. The departing-pipe is immovably attached to the box, so that one end of each 100 ft. of pipe is fast, and the other movable, affording free play to the expansion and contraction. All service-pipes are taken from the junction-box, which is securely bolted to the masonry and anchored to the pipes. The bottom of the box being placed lower than the pipes, all water of condensation is carried forward, and deposited in it; the arrangements for the escape of the condensed water from the steam-pipes will be described presently. At each point of consumption there is a cut-off, under the control of the consumers. The supply-pipes from the mains to the houses are 1¼ in. in diameter, and within each house ¾ in. pipes are used. In addition to the cut-off tap from the main, under the control of the consumer, there is a pressure valve or regulator, by means of which the pressure of steam is reduced, and the supply to the building regulated automatically. This is accomplished by two diaphragms of rubber packing, acted upon by weighted levers, and moving two slide-valves. The first valve is weighted to 10 lb., and the second to 5 lb., or 2 lb. if required. When the steam arrives at the first valve of the regulator, it is under a pressure of 60 lb.; on passing through the first reducing valve, the pressure is reduced to 10 lb.; it is then passed through a second reducing valve, and the pressure lowered to 5 or 3 lb.; thence it passes at this uniform pressure through a meter placed above the regulator, for measuring the amount of steam which passes into each house. Unfortunately, I am not in possession of a drawing or description of these regulating valves or of this meter sufficiently clear to enable me to explain their action in detail.

The distribution of heat in the apartments is by means of the radiators before mentioned, which are of the ordinary shape, consisting of inch-pipes about 22 in. long, placed vertically, either in a circle or in a double row, and connected together top and bottom. The action of these, in enabling the heat to be regulated, has already been explained. The steam, in passing these radiators, becomes condensed into water at 212°. The heat thus remaining and the water may both be utilised. In order to effect this, it is conducted in protected pipes, from all parts of the building where steam has been used, back into the basement, through a specially-devised trap. Here it may be used as warm water, or it may be used for warming fresh air; in this case it is passed into coils of pipes set in a brick chamber; into this chamber cold air is admitted from outside of the building, as in the air-furnace, and coming in contact with the coils of pipes containing the hot water, abstracts the remaining heat, and passes up through the registers into the rooms above, as warm, pure air, while the water, now cold, passes into the tank, for future use if required.

We select the observations of two of the speakers who afterwards commented on the system.

Mr. J. A. Coleman said he had had the honour of reading a paper before the Society of Arts as far back as February, 1875, on a similar subject; and when he visited America a year or two ago he went to see Mr. Holly's system and examined it very thoroughly. A company having several mills in one enclosure would not think of putting a battery of boilers in each, but would collect them at a central point and distribute the steam; it was equally practicable to distribute the steam to a whole town. As to the lack of ventilation ascribed to the system of steam heating, that was a matter for each individual to arrange for himself; some did not provide it, but others had the radiators in the basement, with air conduits from the street, and the fresh air thus warmed was conducted into the rooms above, and this was a much superior plan. The fresh air which was always coming in had to go out again, and thus ventilation was provided for. It was apparent that the economy of this system must be very great, if the one question of condensation in the pipes was settled; and that had been very fully settled. Fifteen or twenty years ago steam was carried 800 ft. or 900 ft. in pipes placed on posts in the open air, and protected in a very simple way; and large steam-engines were driven by the steam passing through the pipe. Mr. Holly showed him his method of covering the pipes, which differed somewhat from that suggested in the paper he had referred to, which was to enclose them in any good non-conductor, such as sawdust, and lay them in brick conduits, so that they might be got at without tearing up the streets, and with a waste-water pipe at the bottom of the conduit, to return the water to the boiler where practicable. Mr. Holly told him, two years ago, that in a mile of pipe he lost less than four per cent. by condensation, which was quite insignificant; but even that figure seemed to be now reduced. With regard to the cost of heating buildings, the figures quoted would hardly convey a true idea to an English mind, because there were no winters here such as they had in America. Last winter was considered very severe in England, but in America it would have been considered very ordinary winter weather. When investigating this subject, he took a large building like A. T. Stewart's in New York, treated it as a box containing so many cubic feet, found what the coal and engineering bills were, and distributing the amount over the cubic capacity, found that the cost averaged by the then existing methods from ·87 to 1·3 cents per cubic foot per annum; while under the system he proposed the cost was reduced, to speak roughly, by about 50 per cent. He remembered open fires in America in his boyhood, and they were always a nuisance, from the dirt and dust they created; it was the same in a lesser degree where an open furnace in the basement was used for warming the building. The saving of labour, and the advantage of being able at any time of the night, if you were ill, by simply turning on a cock, to get the heat you required in a few minutes, must be apparent at a glance. Mr. Holly told him that the difference in the wear and tear of furniture was already very appreciable. If gas-works had to be put up in every private house, gas would be almost too expensive to use, but when gas was manufactured on a large scale the result was, that even with all the progress of electricity, up to the present time, it continued to be a very profitable branch of manufacture. The same principle applied to steam. When he took out his first patent, the patent authorities at Washington told him that the system of heating cities by the use of steam ranked next to the introduction of gas and water. The idea of the whole system which had been floating in his mind for years, took definite form on the night of the Boston fire. His first idea had been to devise a system for protection against fire, and the importance of that subject might excuse him saying a word or two upon it. Both there and in America, buildings had grown out of the reach of the fire apparatus, on account of their height being such, that however powerful the fire-engines, the hose would not stand the required pressure. The consequence was, he adopted for warehouses a system of iron sprinklers, such as are in use in large mills. The sprinklers were connected with a main water pipe in the street. An improvement had since been made on this system by fixing pipes on the ceiling having caps every 10 ft. in length. These pipes remained full of water; a heat of 160° would release the caps, and the pressure of water from a tank on the roof would throw a spray over 100 square feet. If the fire extended further, another cap would be released, and give an additional shower, and it was only in very severe cases that recourse had to be made to the mains in the street. As they could not depend in all cases on the city fire-engines, the collection of boilers in a central place for supplying steam, gave the power, ready at any time, to work the auxiliary pumps.

Dr. Siemens, who was in the chair, in proposing a vote of thanks to Capt. Douglas Galton, said this question was not a new one in the abstract, for heating by steam had been carried out to his knowledge forty years ago. But there was a novelty in the proposal to generate steam in large volumes, at high pressure, at certain centres; and to send it at that high pressure for miles under the streets. It was also perhaps a novelty to divide steam by regulating and stopping valves, and supply it to individual houses, so that it might be used for the various purposes mentioned. The great question which presented itself was, would such a pipe be trustworthy; could it be laid and maintained for this purpose without danger and without trouble. The paper described an elaborate method of insulating the pipe to prevent excessive loss by radiation, and, from the figures given, it seemed to have been very successful; but it appeared to him doubtful whether, in our streets, a pipe so swelled out by insulators, and lags of wood, and planks, could be laid. The space below our streets was already so fully occupied, that the establishment of such pipes would present very great difficulties. As Sir Frederick Bramwell remarked, if they wanted to bring heat into houses, there was another means already established, and in full operation; and from a little calculation he had just made, he found that a cubic foot of coal-gas brought with it about 750 heat units, which would be about the same amount as would be supplied by 3½ cubic feet of steam, at a pressure of six atmospheres. The question, therefore, would reduce itself to this, whether the one pipe or the other could be maintained with the least expense. He, for one, must adhere, for the present, to the opinion that it would be easier to supply gas than steam. The paper spoke of various modes in which steam heat could be used, and the radiator was alluded to, but he did not think that apparatus was very happily named. A steam-heated surface in a room no doubt radiated heat, but not under the same conditions as a fire-place. Probably, nine-tenths of the heat given off from that hot surface would be given off to circulating currents of air, which would pass again and again through this radiator, and a very small portion would pass by radiation into the room. The rays from such a low source of heat would hardly be felt, as radiant heat, at any sensible distance from the source. Now, he looked upon an open fire-place not only as a thing endeared to them by long habit, but he attributed to it very high sanitary qualities. The open fire-place communicated absolutely no heat to the air of the room, because air being a perfectly transparent medium, the rays of heat passed clean through it. It gave heat only by heating the walls, ceilings, and furniture; and here was the great advantage of the open fire. If the air in the room were hotter than the walls, condensation would take place on them, and mildew and fermentation of various kinds would be engendered, whereas, if the air were cooler than the walls, the latter must be absolutely dry. That was the great advantage of the open fire, and it endeared it to them, though many did not know exactly where and how the comfort arose. The

Americans were very ingenious, but he would not take their word with regard to the comfort of their rooms; when he was there he suffered severely from the closeness of the atmosphere of the dwellings, and when he travelled at night in the sleeping-cars he was obliged to get up four or five times and step out on the foot-board to get thoroughly cool. The only explanation he could offer was that the attendants were black men, whose standard seemed to be the interior of Africa. But although he could not agree absolutely with the proposal, yet the question of doing away with the smoke and nuisance which now resulted from open fire-places was so important, that any suggestion, backed by a considerable amount of experience, was welcome; and Captain Galton well deserved their thanks for the able manner in which he had brought the subject forward.

BATHS AT WINDSOR.

A SWIMMING-BATH, for the use of the students at Beaumont College, has just been completed at a cost of 3,500*l.*, from the designs of Messrs. Byrne & Crombie, architects, of Windsor and London. The site, which adjoins the College, is 60 ft. above the level of the Thames, and some 510 yards distant from it, necessitating the water being pumped and forced up to the bath. This is effected by a 10-horse-power engine and steam pump placed 500 yards from a well at the entrance to the college grounds, and forced thence a further distance of about 200 yards through the supply-pipe of a No. 5 pulsometer, supplied by the Pulsometer Company, of Queen Victoria-street. Connected with this is an upright boiler, 4 ft. 6 in. diameter, and 11 ft. high, which heats the water in the bath at the same time.

The bath-house internally is 80 ft. wide and 25 ft. high; the swimming-basin is 66 ft. long, 30 ft. wide, with a depth at one end of 4 ft., increasing to 7 ft. at the other end. The basin itself is formed of cement concrete, 3 ft. thick sides, and 18 in. thick bottom, 4 parts gravel and 1 part cement, rendered inside 1½ in. thick with Portland cement, and again lined with Cliff's white glazed bricks and ornamental pattern borders. The internal walls are rendered in Keene's cement, with a dado, 6 ft. high, of Minton's glazed white tiles, with figured strings top and bottom.

The roof, which is built of a very light construction, is of wrought iron, from the firm of Messrs. Davis Bros., Wolverhampton. The skylight, which runs the whole length of the building, being glazed on Helliwell's patent system.

Two sides of the bath are provided with dressing-boxes, thirty-two in number, with cloak-pins and seats, &c., for each bather. The whole of the external woodwork is stained in two shades, and varnished, the moulded cornice being stencilled.

Special arrangements have been made for ventilating and preventing the condensation of vapour from the bath. The basin itself, containing 50,000 gallons, can be easily emptied in about two hours by an overflow-pipe, which allows the water to pass over a filter-bed, and thence purified into a watercourse in the grounds of the College.

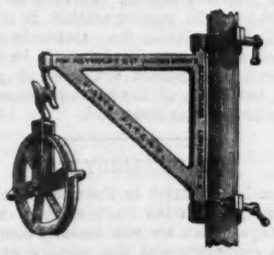
Messrs. A. L. Oades & Sons, of Egham, were the general contractors, Mr. Ventom being clerk of works.

FALL OF A CHURCH BELL.

A REMARKABLE accident, fortunately unattended by loss of life, happened on November 24th in St. Augustine's Church, Vienna. The great bell, named "Ferdinand," fell suddenly while it was being rung for vespers. In its fall it crashed through the staircase and the massive iron works of the [church clock. The bell, which weighs 57 cwt., was hung in 1854 in the newly-erected tower of the church, but could not be used until 1863, the tower being too small for it. The bell is usually rung by the verger and the bellringer, sometimes assisted by boys. On the day of the accident three of the latter were present. The two men and the boys stood quite near the bell, pulling the two ropes by which the bell is swung. Soon after the first few pulls the bell began to creak, then was seen to part from the beam and to remain thus suspended for a few seconds, and then fell, its fall being arrested just below the clockwork, where it got jammed between the massive oak beams of the stairs. Though all this happened within a few seconds, the persons in the belfry did not lose their presence of mind. Two of the boys and the bellringer rushed down the stairs, and found safety in the windows below the clock. The verger and the boy nearest the bell jumped into wall niches close by, the bell almost touching them in its descent. Only when the bell was perfectly at rest, the verger and the boy, who happened to be his son, tried to leave their dangerous place of refuge, but found the way barred by stones and crushed beams, as well as by the bell itself. It was only owing to the fact that at the moment of the catastrophe they had not let go of the rope that they were able, holding fast by it, to perform the dangerous descent. Only one of the boys was hurt, who, in rushing down the stairs, fell, and suffered a compound fracture of the shin bone. The commission which was at once appointed to report on the accident ordered the speedy erection of a scaffold under the tower, to intercept a possible further downward movement of the bell. After its completion, the work of reinstating the bell in its former position will be proceeded with. The catastrophe is at present ascribed to a gradual loosening of the screws which secured the bell to the beam. The tower is not in danger, but it appears to be overweighted, for, besides the fallen bell, there are four more in the tower, the weight of which is together 60 cwt., thus making the total burden 6 tons.

A NEW SCAFFOLD HOIST.

THE invention illustrated below was exhibited at the Smithfield Club Show. A block and fall would even more generally be used for raising building materials if there were not so much difficulty in finding a suitable fixing for it. This difficulty is overcome by Hurst's Patent Scaffold Crane, which can be fixed to any sized pole in a



few minutes, and may be readily shifted from pole to pole if desired. By reversing the bottom collar, the crane may be used either stationary or swinging. The one exhibited was made to lift 2 cwt., but we understand they can be made to any size desired. F. W. Reynolds & Co., of Edward-street, Blackfriars, have secured the sole right to make and sell these cranes, which will probably soon come into general use.

"DEVELOPING SOUTHAMPTON."

I HAVE read the article on Southampton in your paper with some interest, and I take this opportunity to offer some further information thereon.

The paving of some of the footways with blue brick in lieu of stone has effected a saving in the first cost, and enabled the Corporation to extend their operations; but upon the question of blue brick *v.* Caithness stone there is some difference of opinion. The blue brick can be laid at about half the price of Caithness stone, and, therefore, has the preference; but the general appearance, in a main thoroughfare, is certainly not equal to the stone.

The Corporation have put in force the well-known section 150 of the Public Health Act, and the new roads in Portsmouth have been made up by the Borough Surveyor in default of the owners so doing; but we do not consider these new roads "street improvements," they are the natural outcome of the growth of towns.

As regards street improvements, such as removing projections, widening streets, and removing courts and alleys, there is much to be done in the old part of the town, but I hope the day is not far distant when important works in this respect will be carried out.

The new bridge over the South-Western Railway is an important work, as it gives uninterrupted communication between the east and west of the town, and closes two dangerous level crossings close to the terminus and adjoining the station-yard. This bridge is carried by iron girders over the railway, and also over Hartley-street adjoining. The approaches are of considerable length, the greater portion being formed of elliptical arches in red brick. The width between the parapets is 50 ft., and the worst gradient 1 in 30. As the western approaches cross the Cattle Market, a partial reconstruction thereof will be necessary.

The works have been designed by the company's engineer, Mr. William Jacomb, and are being carried out under the superintendence of Mr. J. Drage, on behalf of the company, and of myself on behalf of the Corporation, by Messrs. Joseph Ball & Sons, the contractors.

Southampton has long been in want of better railway accommodation between the North and West of England; and the inhabitants have made determined efforts to remedy this defect, but hitherto without success; there is now, however, some prospect of their hopes being realised.

The Didcot, Newbury, and Southampton Railway Company propose to carry out important works in the borough. Two stations are to be provided, one at Bargate-street, near the centre of the town, and the other at the Royal Pier. The Bargate-street Station will be the chief, and to give a good approach thereto from the High-street, the company propose to widen Bargate-street to 60 ft., and to take down several houses on the west of the old Bargate, so as to form a circus on that side. In addition to this there is a project to remove the corresponding houses on the east side, so as to leave the Bargate in the centre. If they be carried out, it will be a most important improvement of the High-street.

The proposed 60 ft. roadway across the western bay will give a new route to and from the pier, and enable the local authorities to extend their tramways from the Town Quay, carry out jetties, and enlarge to a considerable extent their quay frontage.

The South Western Railway Company have also not been idle; they have deposited plans showing new railways and land reclamation on practically the same lines as the Didcot and Newbury Company. The new street to the Bargate being nearly the same, and the land proposed to be reclaimed being about fifty acres.

In addition to these two companies, there is the Swindon, Marlborough, and Andover Railway Company, who desire to enter Southampton over the South-Western system from Andover. The two first-mentioned companies having adopted the same scheme, and the spirited action of the Local Authorities, will, I hope, convince Parliament of the necessity for better railway accommodation at this important port.

As regards the Southampton harbour, will you permit me, as engineer for the scheme, to add to your remarks a few details of the work?

It is proposed to construct a double line of tramways from the boundary of the Commissioners' property on the western shore to the Town Quay, and to duplicate the present lines to the Southampton Docks; to widen the Royal Pier, and to carry a double line of tramway to the Pontoon, thus providing every facility for increased traffic from the north and west to the Isle of Wight; to reclaim the foreshore east of the Royal Pier for a width of 80 yards, and to erect a new quay wall; to further extend the Quay seaward into deep water for 120 yards; to construct a new quay or jetty 135 yards in length; to erect new warehouses; to provide for dredging the harbour, erecting lights, and for other works.

I think the above summary will show that the Local Authorities are doing all they can to improve and extend the works committed to their charge.

JAMES LEMON, M. Inst. C.E.,
Consulting Engineer, Southampton.

Soane Museum, Lincoln's Inn-fields.—The trustees held their quarterly meeting on Thursday, the 8th inst. Professor Donaldson, Mr. David Mocatta, and Mr. Alan Cole, were present; also Professor W. H. Flower, F.R.S., who attended for the first time after his recent nomination by the Royal Society as the trustee to succeed the late Sir Philip Egerton. Mr. Wild, the curator, reported that the number of visitors to the museum during the present year had been 3,737, and that he was preparing a new edition of the Handbook, illustrated with many additional engravings.

ANCIENT SURREY.

Sir,—In Tymms's "Home Circuit," the cave of Ludlow's Hole, excavated A.D. 1216 as a reservoir for Waverley Abbey, is described, p. 138. Also, Hind Hill, 923 ft. high, described in W. Cobbett's "Rural Rides," with the cavity of the Devil's Punch Bowl, and mentioned in the tale of "Nicholas Nickleby." The manor-houses at Cheam and Clapton; Tooting Church, with its round tower; Tandridge Priory, *temp.* Richard I.; Benbury Camp at Wimbledon, A.D. 568, are described. Reference is made to the "plant about the thickness of a bullrush, with a top like asparagus, shooting up nearly to the surface of the earth, above which it never appears, and when the corpse is consumed, the plant dies away."

This observation has been made in Send and other churchyards, where the soil is light red sand. The fact was noticed by John Aubrey in his "History of Surrey." In *Notes and Queries*, sec. 5, vol. 5, 1876, pp. 169-297, it is suggested by two writers that it may be a species of *Equisetum Telmateja*. In vol. 13 of the *Penny Magazine* are views of Farnham Castle, of Nonsuch House, of Chertsey, and of Croydon Church and Palace, also of a mill near Waddon, and of Beddington Church. In the *Saturday Magazine*, vol. 14, information is contained as to Elias Ashmole; in vol. 19, as to Kingston-on-Thames; and Guildford Castle, vol. 6.

In the British Museum Library, Add. MSS., Nos. 6,735, f. 120, 122, and No. 6,746, f. 15, are the curious collections of R. Symons; No. 24,004-5, various views in Surrey; No. 25,712, Add. MS., Surrey in the nineteenth century; No. 4,704 MS. describes the ancient Surrey tenures, such as Borough English at Dorking. In a volume of excursions, 8vo., Longmans & Co., A.D. 1822, there are views of old buildings in Surrey, Lambeth Palace, &c., which are described. This is one of several similar topographical volumes descriptive of England.

In "Select Topography," by W. E. Trotter, 1839, are engravings of Richmond, Dorking, Leatherhead, Walton-on-Thames, Shepperton,—in Saxon, "Sceapheard-ton," a habitation of shepherds. In Carter's folio views, B.M. Lib. Add., are views of Farnham and Guildford Castles, with the chapel on the hill, and several at Oatlands House, restored in the nineteenth century. Waverley Abbey, also, is noticed.

In his "History of the Protestant Reformation," W. Cobbett described abbeys at Aldbury (*temp.* Richard I.), Bermondsey (1089), Chertsey (666), Lingfield (*temp.* Henry VI.), Merton (1116), Newington (1551), Reigate, founded by William de Warren, Earl of Surrey; Shene (1414), Southwark, St. Mary Overy and Overy Hospital (1228); also Tandridge or Tanregge (*temp.* Richard I.), Waverley (1128). In his "Rural Rides," also, this author described places in Surrey. The house at Farnham where he was born is, I believe, extant, being the Jolly Farmer Inn.

In Howitt's "Visits," vol. i., Wolsey's Tower at Esher is engraved (p. 245),—that is, the Gate-house. The mansion of Bishop Waynflete, extant 1673, in Aubrey's time, is destroyed. At Apscourt, near Molesey, are, or were recently, the traditional remains of Wolsey's house, said to derive its name from A.P.S., the three letters in Archiepiscopus. Near Walton the old mansion of Ashley Park is attributed to him. Richard Symmes's "Surrey Collections" were given to Mr. W. Bray, in 1813, by the Earl of Onslow (see Add. MSS. 6,167, B.M. Lib.), being tolerably legible, chiefly Latin contracted. Mr. Symmes was the town-clerk of Guildford (22 Charles II.) 1670. He died in 1680. The Add. MSS., 11,573, are the notes of Mr. Tyton in Surrey. The Add. MSS., 11,571, contain also notes of Surrey in large and small folio. In John Aubrey's "Surrey," 1673, five vols., 1719, with his portrait, it is stated that Baynards, near Cranley, was built by Sir G. Moore, A.D. 1577. It is engraved in Hone's Year Book, pp. 930-938, with a description. Wotton Church, p. 313, and Banstead Church, p. 552, with its leaning spire, and Dorking Church, are described. In the *Gentleman's Magazine*, vol. lix., p. 1 (1789), Weston House is engraved. In vol. lxxi. is Oatlands, and Winchester Palace, Southwark, is in vol. viii., part 2, which I described in the *Builder*, No. 1,765. In Neale's "Views of Seats," second series, 1826, vol. iii., are views, with a description, of Albury, Clandon, Deepdene (three views), Ockham, Roehampton House, and Shalford. In the first series are views (vol. iv.) of Ashley Park, Ashstead, near Epsom; Beechworth, Claremont, and Farnham Castles; Ham House, 1821; Loseley, 1562-68,—the hall being 42 ft. long and 25 ft. 2 in. wide; the Oaks, near Epsom; the Rookery, near Dorking; Shirley and Selsdon, near Croydon, with Sanderstead, are engraved. In Nash's "English Mansions," folio 1869, Beddington Hall, Sutton Place, and Loseley are engraved. Sutton is described as "a splendid specimen of the enriched brickwork of the time of Henry VIII., built about A.D. 1530, being red brick with chequer work of black brick." Beddington was rebuilt about 1609, except the hall. At Loseley there is stated to be a portrait of Sir W. Moore, the founder. Aubrey mentioned, at Titsey, near Ewell, a large old mansion near the church; a copper coin of Constantine the Great was found there. At Crowhurst Place, near Lingfield, was the ancient residence of the Gainsford family before the Norman conquest. This old timber house was moated. The hall was open to the top, and the windows were full of escutcheons. It was sold in 1706, valued at 400*l.* yearly. At Guildford, the almshouse, of brick, quadrangular,—a noble tower, having at the entrance four small turrets over the gate, founded by Archbishop Abbot,—is described by Aubrey, who stated "Lothesley, a seat of the Moores," is about the time of Henry VII., with its armoury and antique furniture. He alluded to the plan of the shepherds at Epsom hurling stones from a half-horn at the top of a pole to keep their sheep on the Downs within bounds. Mr. Aubrey mentioned a camp of twelve acres on Walton-hill, that is St. George's-hill. He was informed by Ashmole that the old current of the Thames is here changed, and the part of Middlesex over against this place was divided formerly from Surrey, about A.D. 1450. W. Lilly, whose tomb is in Walton Church, practised as a M.D. at Horsham, under a Lambeth degree. In 1652 he bought his house for 950*l.*, and bequeathed it to a son of Sir Bulstrode Whitlocke. Oatlands Aubrey described as "a very fair house." In 1673, a brick wall encompassed ten acres of ground. Only a few parts of the house remained then, and, ere long, it was destroyed. C. C.

THE DUMBIEDYKES.

There is a district in the neighbourhood of Edinburgh, within the Parliamentary borough now-a-days, which we had recently occasion to visit in connexion with the opening of a new church. A few jottings we made at the time may be of service to some of our readers. It is, of course, unnecessary to quote Sir Walter Scott, who, in his celebrated novel, the "Heart of Mid-Lothian," gives some prominence to the admirer of Jeanie Deans, the Laird of Dumbiedikes.

The Dumbiedykes is simply *Scotice*, or, rather, old Anglo-Saxon, for the "dumb-walls," *i.e.*, the locality of the walls of a former Institution for the Dumb; or, in other words, the old building which may still be seen at the foot of Brown-street. It was once the palace gardens of Holyrood, but within the recollection of old inhabitants it was devoted to the useful occupation of market gardens.

At this moment it is by far the most densely-crowded district in Edinburgh, forming an adjunct to the overgrown and, at one time, suburban parish of St. Cuthbert. In the space of probably half a mile it contains a population of over 19,000, a circumstance of itself deserving of study. How this population has been provided with houses, and the character of these houses, are not unknown to our readers; in point of fact, the district has been the scene of two or three of the highest and most successful efforts to provide houses on a large scale, and at a moderate rent, to the working classes of Edinburgh, which is somewhat curious. The origin we will briefly explain.

Five-and-twenty years ago the Government needed a site for a new post-office in Edinburgh, and selected that of the old Theatre Royal in Princes-street; no doubt, one of the most central and commanding situations in the whole city. We remember the old theatre very well. Siddons, Scott, Mackay, Murray, the elder Kean, Macready, were all *débutants*. In fact, the old Theatre Royal was as celebrated as Drury Lane. The carcass of the old theatre, together with the surrounding buildings called Shakespeare-square, were purchased by the late Mr. Robert Hunt, an opulent builder in Edinburgh, for a mere trifle. As the cry for workmen's houses was then at its height, he bethought him of utilising this waste ground at the Dumbiedykes; and we are bound to report that his perception was good. He accordingly *leased*,—or, as it is called in Scotland, *feued*,—the whole line of frontier facing the Queen's Park, and thereupon turned the old stones of Shakspeare-square into humble yet commodious and comfortable houses with three rooms, fitted with good fire-grates, good gasfittings, good water-supply, and excellent water-closets.

The houses filled with tenants at once. A demand arose. The demand was quickly enough followed by the supply, which grew so much that in another year or two the waste ground in the whole district was built upon. But the ground was of the nature of a heavy slope facing the Park, and of a different formation.

The Iron Church was set up about ten years ago by one of the best preachers, Mr. Ferguson; and on the 29th of May, 1880, the foundation-stone of the present church was laid by Lord Rosslyn, Commissioner of the General Assembly, with Masonic honours. The new church was opened on Sunday, the 13th of November. The style is Early English. The building has a graceful spire, and a solid and substantial substructure, good interior (plain, but substantial), a covered timber ceiling, nicely proportioned, with galleries supported by handsome brackets tastefully decorated. The architects are Messrs. Thornton & Shiells.

THE NEW SYSTEM OF COMPETITIONS.

Sir,—Now that the preliminary drawings for the Glasgow Municipal Buildings have been sent in, it may be well, in the interests of future competitors, to consider the working of the amended scheme for public competitions, more especially as there seems to be a disposition to make the regulations for this one into a model for others of a similar kind, and even for those of much smaller magnitude.

It will probably be a surprise to the assessors to find what a mass of labour their instructions have entailed upon those who have conscientiously striven to follow their leading, and it is very desirable they should realise this, in order that they may, in every possible manner, lighten the labour of those who are chosen for the second round in this competition. It cannot be necessary to require much more from them, as the drawings already sent in comprise a plan of each of the four floors, four elevations, two sections, and a view. These are of themselves almost, if not quite, sufficient to decide upon, and any further drawings required ought only, in common fairness, to be such as to test the capability of the selected men.

Any attempt to exact complete sets of plans, &c., to an eighth scale, would involve a vast amount of labour, which in nine out of the ten, would be unnecessary and useless, and for which the remuneration proposed would be quite insufficient. In fact, one-tenth scale would be ample for any such purpose, the reduction from one-sixteenth to one-twentieth having proved of little advantage, the latter scale requiring considerable accuracy and precision in drawing.

In any future regulations of this kind it is most important that the labour should be minimised in the first trial of skill. Except for buildings of unusually great importance, two or three drawings to a small scale, with option of being drawn in pencil, would be quite sufficient to enable a qualified architect to select the best for further development. Observer.

Timber Yards in the Metropolis.—At the meeting of the Metropolitan Board of Works on the 9th inst., the draft of the proposed New Metropolitan Bridges and Management Bill was under discussion. Exception was taken to the clause which proposes to impose new conditions and restrictions as to the size and position of timber stacks, and it was urged that persistence with the clause would endanger the whole Bill, owing to the powerful opposition of the timber trade, whose interests are greatly affected by the clause. On its being put to the vote that the clause be retained in the Bill, 12 members voted for it and 13 against it. A division being demanded and taken, the votes on either side were equal,—15 to 15,—whereupon the Chairman of the Board gave his casting-vote in favour of the retention of the clause, which was, therefore, left part of the Bill.

THE NOMENCLATURE OF COLOURS.

SIR,—It is of great importance that a correct understanding should exist as to what a certain word or name represents as regards a given colour.

For some time past I have noticed that the stainers (*i.e.*, the natural colour ground in oil or water) of various firms differ considerably. I have taken yellow ochre, raw sienna, burnt sienna, Venetian red, Indian red, raw umber, burnt umber, in a certain quantity, from three good firms, have mixed them with a regular proportion of four to one good old white lead, and found the result most conflicting and contradictory; in fact, for example, the stainer of one firm called yellow ochre appears in the case of another firm to be raw sienna, and raw sienna in another firm to be the Venetian red of a third. Now, this is of importance to the client wanting the best character of work, to the architect intending to obtain it, and to the decorator desiring to execute the same. But in matters of colour where is the standard? Would it not be within the province of the Painter-Stainers Company to attempt the solution of the matter by getting a standard fixed as to what the name of each colour represents?

It does not follow that firms would supply to that standard,—that would be a question of price and commercial dealing,—but an admitted standard for reference would be of practical value to both architect and decorator. I trust you will give your valuable aid to the solving of this every-day difficulty.

STEPHEN S. PHILLIPS.

WOODS.

SIR,—A good many erroneous impressions prevail respecting timber. We always had an idea, in common with others, that walnut was a very rich and expensive description of wood. Probably auctioneers' catalogues of eligible and tasteful furniture had the effect of heightening that idea. We learn, however, from a specialist in the trade that English walnut is almost valueless, the Italian walnut being that alone for which there is any demand in the market. Many antiquaries formerly contended that the wood generally used in the construction of houses anterior to the Great Fire was chestnut, but in the vast majority of cases this was the common oak. The famous woods formerly round Sittingbourne, of Spanish chestnut, favoured the popular idea that it was indigenous to England.

A. B. C.

THE STYLE FOR A NEW CATHEDRAL.

SIR,—You have already noticed, without approving, that in last month's number of the *Nineteenth Century* Canon Venables urges very forcibly the adoption of Sir Christopher Wren's first design for St. Paul's Cathedral for the proposed Cathedral of Liverpool, and while agreeing with him that this would be doing honour to our greatest Renaissance architect, yet I wish to point out a few fallacies with which the Canon supports his argument.

In the first place, he banishes altogether the Byzantine architecture as an appropriate one for Christian churches. The fact is, however, that the style of St. Sophia is the grandest and most perfect yet conceived for the purpose of Christian worship, and in no way could Liverpool show better her common sense and independence of prejudice and conventionalism than by erecting her new cathedral in this, rather than in the Gothic, Roman, or any other style.

On the other hand, it is, I think, presuming too far to take it for granted that the Gothic is universally allowed to be the only style suitable for a modern church. It is true that a great reaction in favour of our ancient architecture has followed from the insipid and tasteless buildings with which we were for so long overrun under the name of Italian; but there is little doubt that this has been carried too far, and that the countless churches built all over the country are more suitable for Roman Catholic worship than the altered requirements of the Protestant religion. In building our dwelling-houses, though we may still keep our own beautiful pointed arch and various other things which our forefathers before the outbreak of the destructive "Classical" mania had patiently and carefully evolved for us, we still find it necessary to adapt and modify considerably to suit modern requirements very many features of Gothic architecture as it was left us by the sixteenth-century builders, and it is, therefore, pedantic and inconsistent not to do the same as regards churches.

It is a very good thing, no doubt, to vary the monotony by introducing different improvements, or even specimens of entirely diverse styles, from other countries, and England, like many other nations all over the world, owes some of her most splendid efforts of genius, and most picturesque elements, to the adaptation of Renaissance features. But mere mechanical copyism or indefinite multiplication, whether of Corinthian capitals or Gothic arches, without any reasoning adjustment to advancing necessities or play for individual talent, is death to all art, and not, in fact, architecture at all; and dread of the stereotyped jumble of bits taken at random from Gothic edifices, or the inevitable wearisome rows of imitation Greek columns (which, with the chimney-pot hat, appear to be making the tour of the globe), that will arise if either of these "styles" is decided upon, makes us ready to fall back on a really noble and original design, even if somewhat stale, of a talented artist like Wren.

The only other arrangement from which we might expect anything better can scarcely be hoped for, namely, that an opportunity should be given for the embodiment of a new development appropriate to present uses, and which, though on the basis of Gothic, should combine the structural fitness of the Byzantine style, and avail itself of the various mechanical and æsthetic improvements suggested by modern science.

EVACUATES.

EMBLEM OF THE TRINITY.

SIR,—In the *Builder* for December 10, in an illustration pertaining to Mr. Dobson's lecture upon "Symbolism," is given a representation of the Holy Trinity, as shown in some stained glass at St. John's Church, Micklegate, York. It is fourteenth-century work.

It may be passingly interesting to record that an almost precisely similar embodification of the Trinity exists at Black Abbey, in Kilkenny. It is carved in, if I remember rightly, alabaster, and bears the date, at the foot of the cross, of A.D. 1264. Its proportions are exactly the same. The Eternal Father, however, at Black Abbey is crowned, and holds both hands, not one only, up in the act of blessing. Further, the dove, instead of being at the left side of our Lord's head, in the Irish example, is immediately above it. In both examples our Lord is crowned with thorns, and altogether the general affinity between the two is remarkably great.

HARRY HEMS.

HOMES OF THE LONDON POOR.

SIR,—In your issue of the 26th ult., under the above heading, is a report of an inquest, which shows what dwellings the humble toilers in London have to take up with. The man being a music printer was possibly like many other printers working in London offices, excluded from the workmens' train in consequence of his hours,—eight a.m. till eight p.m.,—and therefore obliged to live near his work. There are at this time many printers living in the courts of Fleet-street, whose children are employed as machine-boys in printing, bookfolders, &c. It is plain that workmen's trains do not suit printers, although more of them have been dislodged than any other class by the City improvements and railways. Printing having been so long and extensively carried on in the City their case is deserving of notice.

Perhaps it may be asked why such uncomcomfortable rooms are taken. To this I would answer, the supply does not appear equal to the demand; and again, cheapness has to be considered, for all have not constant work; and last, but not least, the Assessment Committee, with their professional valuer, have a great desire to increase the annual value of houses, because it is an easy way to raise the local taxes, which tends to increase the rent of rooms, neglect of house repairs, &c.

H.

The Parish Church of Blythburg, Norfolk, has been closed by order of the Bishop of Norwich, on account of the dangerous condition of its fine hammer-beam roof. The church is called one of the best examples of semi-Flemish thirteenth-century architecture, but it is altogether in a very dilapidated condition.

SAFETY FROM FIRE OR PANIC IN PLACES OF PUBLIC ASSEMBLY.

SIR,—Terrible experience, of which history is silent, may have taught the architects of Greece and Rome; for the ruins of ancient theatres and amphitheatres are perfect models in material and construction for ensuring the safety of great assemblies from the dangers of fire or panic.

But even if we had unlimited funds at our command, our climate would not permit of a series of stone benches rising tier above tier under the open sky. Still, although we cannot have solid structures of stone or brick throughout, more might be so built,—at least, the proscenium should be of plastered brick.

The spectacular demands of the modern stage require artificial lights, inflammable dresses, and scenery that increase the danger from fire; and the knowledge of this by the audience makes them ready to be panic-stricken at the slightest alarm.

The progress of a fire in a theatre is now so rapid that it would be almost impossible to increase the means of egress to such an extent as to assure the safety of the audience that way. A person thoroughly acquainted with the place, and having a clear way, unable to escape from an empty house, has perished in the flames when a fire broke out.

It is in the means of instantly quenching a fire, that we must look for safety. Hitherto all means such as iron screens, extincteurs, firemen (so called) in the house, have proved miserable failures. The work requires to be done at a moment's notice by some one free himself from personal danger, and, consequently, panic, or the turmoil of a surrounding panic. In the first place, there ought to be water-pipes to shower a flood of water upon any or every part of the house on the turning of one or more levers; these should be in a chamber, from the window of which every part of the house is discernible, without any direct communication with it. This chamber should have a separate means of exit, so that the man in charge shall have no reason to be anxious for his personal safety.

The man ought to be a tried member of the Fire Brigade, appointed to the post by the police authorities, and altogether independent of the manager of the theatre. He ought to be visited by the inspector of police for the district, who ought to report any irregularity.

The apparatus ought to be frequently tested by the police, when, of course, hose would be attached to carry the water off without injury to the house.

The lessees, if taxed for the maintenance of such a system, and therefore disposed to grumble, may remember that a fear of fire is never altogether absent from the minds of the audience, and that possibly such a fear may keep many from attending a theatre.

G. CHAPMAN.

BODY-SNATCHING.

SIR,—The recent startling revival, on both sides of the Atlantic,—in the United States and Scotland,—of what was presumably a lost art,—that of the resurrection-man,—may permit the suggestion to some that wherever such distressful disturbance, from motives of revenge or motives of cupidity, is in any degree presumable, the simple, short, and inexpensive expedient of lining the grave all round with a few feet of cement concrete (rapidly hardening like rock, unaffected by moisture, and enduring as embalment) would at least so protract the nefarious and ghastly operation as to render prevention a matter of certainty in precise ratio to the thickness of the enclosure.

E. L. TARBUCK.

ANTHRACITE.

SIR,—May we be allowed to call attention to a portion of your leader last week re anthracite coal for domestic purposes, which appears to have attracted considerable attention, and has been quoted in several of the daily papers?

We would point out that all coals give off carbonic acid gas, and that anthracite requires a good draught to burn at all; this draught is more than sufficient to carry off the carbonic acid and other gases that may be generated; in other words, carbonic acid gas cannot be produced from anthracite coal without sufficient draught to carry it off.

Your description corresponding with our exhibits, we have had numerous inquiries at the Exhibition; these we are easily able to satisfy, but as your statement, unqualified, is likely to mislead the general public, we would ask you to insert this letter.

Anthracite coals are burnt almost entirely in Carmarthenshire and Pembrokeshire.

ARCHD. SMITH & STEVENS.

CORNER BUILDINGS AND THE LINE OF FRONT.

Sec. 75, Metropolitan Local Management Amendment Act, 1862, as applied to Corner Buildings.)

Sir,—I have read the paragraph on this subject in the *Builder* (p. 724), with the greatest interest, and while I entirely agree with what appears to me to be the commonsense view there expressed, I have reason to remember that this reading of the Act is certainly not universally accepted.

As Surveyor to the "Rolls Estate," I have frequently had much difficulty and annoyance in connexion with this question; and as my experience may possibly be of interest to your readers, I venture to state a case which appears to me to be much to the point.

In 1870 I let a corner piece of ground on a building lease, this ground having a frontage in the St. James's-road (Bermondsey), and a side frontage in the Rolls-road. The side frontage of the opposite house extended to the footpath, and the general line of frontage in this road is very irregular, although the houses immediately adjoining were set back 10 ft. No question arose as to the front building line in the St. James's-road, but the Bermondsey Vestry took proceedings to compel the builder to set back the side frontage to a line, fixed by the Architect of the Metropolitan Board on the application of the Vestry, extending from the side frontage of the house on the opposite side of the St. James's-road (forming the angle of the Rolls-road) to the houses adjoining the plot in question in the Rolls-road, thus setting back the side frontage from 5 ft. 6 in. at the St. James's-road end to 9 ft. 2 in. at the back. The freeholder spared neither trouble nor expense in contesting the question before the magistrates, but the decision was given against him, and, in pursuance of the order then made, the Vestry demolished so much of the house as was erected in front of the frontage line as laid down by the Metropolitan Board.

The magistrate refused to grant a case, and the rule *nisi* granted by the Court of Queen's Bench, calling upon the magistrate and the Vestry to show cause why the former should not state a case, was argued, and discharged with costs against the applicant.

The house frontage was reduced from 20 ft. to 14 ft. 6 in., and the freeholder was obliged to purchase the lessee's interest, as he could not allow him to be the sufferer.

A more recent case (1879) bearing upon this question is that of the Prince Imperial public-house, in the Rotherhithe New-road, the side frontage of which, in the Rolls-road, the Bermondsey Vestry compelled the freeholder to keep back 5 ft. from the footpath.

R. J. Dickins.

PUMPING WATER FROM ADJOINING OWNERS' PREMISES.

KNIGHT *v.* MOWLEM.

This was an ex-parte application of the plaintiffs, before Mr. Justice Chitty in the Chancery Division, for an injunction to restrain the defendants from pumping water to the detriment of plaintiffs' buildings.

Messrs. John Knight & Sons, the well-known soap manufacturers, had erected at the cost of 50,000*l.*, large soap works at Silvertown. Within the last ten days Messrs. Mowlem, the large contractors, who are about to erect some buildings immediately adjoining, have been preparing the foundations, which they are draining by means of powerful steam pumps, which are kept going night and day, Sundays included. The immediate foundation is clay, but the sub-soil is peat. The effect of the pumping is that the water is not only drawn from the defendants' foundations, but from the plaintiffs' as well, and a dangerous settlement is taking place, and the "stuff house" has already given way. Application was made to the defendants to cease their operations, but this they declined to do. In anticipation, therefore, of still further danger being incurred if the pumping was continued till Monday, the plaintiffs applied for an injunction to compel the instant stopping of the pumping.

Mr. Romer, Q.C., and Mr. Oswald appeared for the plaintiffs.

Mr. Justice Chitty, on the authority of the case of Chasemore *v.* Richards, which decided that where water was not running in known channels it might be abstracted, refused to grant an injunction *ex parte*, but gave leave to serve notice of motion on the defendants for Tuesday last.

THE MONUMENTS IN ST. PAUL'S CATHEDRAL.

Considering the large sum about to be spent upon what some consider an unnecessary addition to the bells already existing in the Cathedral, may I not ask who is responsible for the present disgraceful condition of the noble and beautiful marble monuments there? I have personally witnessed the state these beautiful productions, from some of our finest sculptors, have been in now for the last ten or twelve months. So thickly are they covered over with dirt and dust that it would take a considerable amount of time and labour to restore them to anything like the natural colour of the marble.

R. P.

Fall of Houses at Limehouse.—About a quarter to five o'clock on Tuesday evening two houses, Nos. 20 and 22, North-street, Limehouse, which have been for a considerable time uninhabited, owing, it is said, to their dilapidated condition, suddenly fell, with a loud crash, into the street. It is stated that some children were playing inside the houses, and were also looking for firewood, when one of their number began to pull at one of the window-sashes. This suddenly gave way, and the walls and ceilings followed, burying the children and nearly suffocating them with the clouds of dust. Six children were injured by the fall of the buildings.

CHURCH-BUILDING NEWS.

Warminster.—Christ Church, which has been closed for some weeks for extensive alterations, was re-opened a few days since. The west gallery, which formerly blocked up what were considered two of the best windows of the church, has been pulled down, and the old lobbies beneath have also been taken away. The ceiling has been removed, leaving only a lofty open-timbered roof, and adding greatly to the general effect of the building. Two rows of Bath-stone arcades have been thrown up to support the edifice, making a lofty and well-proportioned nave with aisles. The chancel-arch has been elevated and embellished. The decoration of the walls is not yet complete. A sage-green dado, 6 ft. high, runs round the walls, and will be surmounted with further and more elaborate embellishments. Mr. Vialls, of London, has been the architect, and Mr. J. Gaisford, of Warminster, the contractor; Mr. John Ponton having been the sub-contractor for masonry, &c., and Mr. Grant for plastering and colouring. The carved work in wood and stone was done by Mr. Harry Hems. The beams of the roof were stained by Mr. Luke, and the seats by Mr. Edwards. Mr. R. R. White executed the gas-fitting. The church now contains about 750 sittings, of which 250, in the aisles, are set apart for children.

Edinburgh.—North Merchiston Established Church, an important addition to the ecclesiastical edifices of Edinburgh, has made rapid progress during the past six months. The building occupies a site on the Slateford-road, opposite the new Dairy Cemetery, and will accommodate 1,000 persons without galleries. It is in the Gothic style of the thirteenth century. The plan consists of a nave and side aisles, with a small transept for organ at the east end of the north aisle, adjoining which is the vestry. The principal entrance is at the other end under the tower, the base of which forms the porch, while to the west of this is placed a session-house, a hall for prayer-meetings, &c., and a beadle's house, so that the total length of the buildings fronting the Slateford-road is 197 ft. The width of the church inside is 62 ft. 6 in., and the height from the floor to the top of the ridge is 66 ft. The tower is nearly 30 ft. square, and rises to a height of 134 ft. 6 in. above the road. The richest part of the exterior is the east gable. This has massive buttresses at the angles, between which the whole space is occupied by three tall lancet windows, having clustered shafts between them and arcading on each side, while between the window-sills and the base course an arcade with clustered shafts extends across the gable. The architect of the building is Mr. John Honeyman, of Glasgow.

Letterston (Pembrokeshire).—This church was re-opened by the Archdeacon of St. David's, on the 30th ult., after considerable alterations and improvements. It was badly rebuilt some thirty years back, and nothing could be colder,—more comfortless,—than the interior prior to the execution of the recent works. The roofs have been boarded and otherwise improved, and encaustic tiles substituted for the damp stone flagging. New open pitch-pine seats have been provided in the nave, and stalls in the chancel, with reading-desks, communion-table, and altar-railing. A commodious vestry has been added, one of Porritt's warm-air apparatuses supplied, and new chancel-arch, windows, and doorways throughout are substituted. More, however, requires still to be done when funds permit. The work has been carried out by local tradesmen, from the plans and under the superintendence of Mr. E. H. Lingen-Barker, architect.

DISSENTING CHURCH-BUILDING NEWS.

Lossiemouth.—The new United Presbyterian Church, at Lossiemouth, N.B., which stands facing the sea on the higher side of the square of Branderburgh, has been opened for worship. The building is in the Gothic style, and is entirely of freestone. The principal architectural feature of the building is the front gable, surmounted by the belfry, rising to a height of about 80 ft. Each of the front angles of the building is supported by a double buttress, and on each side of the large doorway there is also a buttress, all of them surmounted by carved finials. Above the doorway there is a large window, something after the style of the Alpha window of the Elgin Cathedral. The platform at the further end of the church is ascended by a staircase on either side, enclosed by iron railings. The front of the platform is of Gothic panelling, stained and varnished, like the front of the gallery, all round. Below, and immediately in front of the platform, is a commodious choir seat, only slightly raised from the area of the church. The gallery extends all along the sides and the gable of the church in front of the platform, and is supported by iron pillars. To the rear of the church are the vestry, and a large meeting-hall. The cost of the building has been 2,020*l.* The architects are Messrs. Matthews & Mackenzies, Elgin. The contractors were:—Mason, Mr. Alexander, Buckie; carpenter, Mr. Kenneth M'Kenzie, Lossiemouth; slater, Mr. Findlay, Elgin; plumber, Mr. Gordon, Elgin; plasterer, Messrs. Brown & Munro, Elgin; painter and glazier, Mr. Ellis, Grantown; ironwork, Messrs. Seller & Co., Elgin; while Mr. James Smart was inspector of works.

Miscellanea.

Too-attractive Shop Windows.—The recent decision of the Court of Queen's Bench in the case of Manchester shopkeepers exposes an injustice which we do not think will be silently submitted to by a class which is able to make its voice heard, and which possesses not a little influence. The dealers in question were each mulcted in a fine of forty shillings, which was a trifle; but the sting of the sentence lies in the order of the judge, who bound them under a penalty of 500*l.* not to repeat the offence. In other words, he constrained them from carrying on legitimate trading in a way which has always been looked upon as being sanctioned by law. But such appears not to be the case. The local authorities, which happen to be the Manchester Corporation, by virtue of some antiquated regulations, thought fit to prosecute the dealers for seeking to arrest the attention of their customers by exhibiting in their windows attractive photographs, &c. There appears to have been nothing morally wrong in the display, the only offence being, according to the existing law, the assembling of large crowds. It is thought that these crowds might have been dispersed by proper police supervision; but instead of using the powers thus possessed, the authorities prosecuted, and successfully prosecuted, the offenders for causing an obstruction. We have no hesitation in saying that, if the law which sanctions such persecution is statute law, the sooner it is abolished or amended, the better for the community.—*Iron.*

Explosion of a Street Lamp.—At Stratford-on-Avon, on the 2nd inst., an alarming explosion of gas took place in Warwick-road, resulting in the complete destruction of the large public lamp which stood in the open space near the Red Horse bowling-green. A slight escape of gas was suspected, the lights of the lamp not being so full as usual, and in order the better to discover its whereabouts, one of the corporation gasmen was sent to make an examination of the lamp soon after the extra pressure was put on at the works. The man obtained a ladder, and opening the globe of the lamp examined the burners. The escape was considered only trifling, and thinking it was in the vicinity of the burners, new ones having lately been put in, the gasman applied a light underneath. Immediately afterwards there was a terrific explosion, the lamp being shattered, and the whole fell with a tremendous crash to the ground. The masonry was upheaved, and the paving stones around torn up and displaced. The standard was hollow, and it is supposed that a slight leakage in the supply-pipe had filled the interior of it with a mixture of gas and atmospheric air, producing the explosion when a light was applied.

Appointment.—At a meeting of the Leeds Town Council, held last week, it was decided to instruct Mr. W. Hoffman Wood, building and quantity surveyor, of Leeds, to take off the quantities for all new buildings erected by the Corporation of Leeds.

Railway History.—The Exeter newspapers for the 13th inst. contain the following obituary announcement:—December 11, at Mount Vernon, Magdalen-road, Exeter, Elizabeth Gray, aged 66 years, eldest daughter of the late Thomas Gray, the author and projector of the railway system.

Bodmin Asylum, Cornwall.—The important additions to Bodmin Asylum, which are about to be undertaken, will supply additional accommodation for 170 pauper patients. The main building will be two stories in height, and will exceed 250 ft. in length. It will contain large day-rooms and dormitories, with a proper proportion of single rooms, approached from the corridors, which will be the entire length of the building and 10 ft. in width. At one end of the structure will be an epileptic ward, shut off from the rest of the establishment, and constructed on the most approved modern principles. Attendants' rooms will be in close proximity. In central positions there will be spurs thrown out for bath and dressing rooms, lavatories, and closets. All the drains will be extra-mural and ventilated. Detached for the most part from the main building,—but connected with it and the last erected asylum block by corridors,—will be a hall to dine about 240 patients, with kitchens and offices in the rear. In front of this detached building will be the apartments of the assistant medical officers. The building will be erected and faced with an excellent freestone, quarried on the asylum grounds, and now being raised by the patients. The plans, which have been approved by the Commissioners in Lunacy and the Home Secretary, have been prepared by Mr. Norman and Messrs. Hine & Odgers, the joint architects (Plymouth) whose designs for the Carew-buildings (for private patients) were accepted in competition about eighteen years ago, and whose professional services have since been retained by the visiting justices. The new buildings will be publicly tendered for early in the coming year.

House and Police Telegraphs.—We understand a complete system of telegraphs has been introduced in the metropolis, between the nearest police or other stations and mansions, banks, public offices, and places of business of all kinds where valuables or valuable securities are kept. By this system when a house is shut up for the night, and in communication with the nearest police or other station, no one can enter the premises without giving instant notice of the same at the station. The name and number of the street being shown as distinctly to the man on duty at the station, as if he were standing before the house itself, and if necessary the exact room or part of the building wherein the attempted burglary is being made can also be indicated. The marvellous assistance which this system affords cannot fail to be recognised in the proper quarter, and we should say it only requires to be known in order to be taken up by all business men and gentlemen having valuable property at their houses, which offer inducements to the burglar and robber. This safeguard is the invention of Messrs. Francis & Co., the well-known telegraph engineers, of Hatton-garden.

Death of Sir Antonio Brady.—We regret to see the announcement of the death of Sir Antonio Brady, whose career of usefulness in the service of the public was of two kinds,—official and general; but his labours have assumed a greater prominence since he ceased to serve the State in an official capacity. He assisted in preserving a considerable portion of Victoria Park from the inroads of bricks and mortar; and he subsequently threw all his energy into the movement for preserving Epping Forest to the use of the public. He was announced to read a paper on Wednesday, at the Brighton Health Congress, on the prevention of smoke in fireplaces.

Borough Engineer, Newcastle.—At the last meeting of the Town Council the business was the election of a Borough Engineer and Town Surveyor, the following being a list of the selected candidates and the amount of salary asked for by each:—Garrett J. Barry, Liverpool, in private practice, 800*l.*; Ernest Benedict, resident engineer, London and South-Western Railway, 900*l.*; J. Bartwright, Borough Engineer of Bury, 700*l.*; R. Davidson, Sheffield, Borough Surveyor and Engineer of Sheffield, 1,000*l.*; James Hart, St. Helen's, Borough Engineer and Surveyor of St. Helen's, 750*l.*; Albert Latham, Margate, Borough Engineer and Surveyor of Margate, 900*l.*; W. George Laws, Newcastle, in private practice, 600*l.* Ultimately Mr. Laws was elected.

Value of Land in the City.—No 50, Eastcheap, containing 1,685 superficial feet, was let by auction by Messrs. Philip Tuckett & Co., of 10A, Old Broad-street, on Wednesday last, on a building-lease for eighty years, at a ground-rent of 1,200*l.* per annum.

Prize-gainers, Royal Academy.—The principal prize-winners were Mr. Samuel Melton Fisher, Gold Medals and Travelling Studentship (200*l.*), for historical painting; Mr. Bryan Hook, Turner Gold Medal and Scholarship (50*l.*), for landscape; Mr. Oscar Alexander Juncker, Gold Medal and Travelling Studentship (200*l.*), for composition in sculpture; Mr. James Howard Ince, Gold Medal and Travelling Studentship (200*l.*), for a design in architecture; Miss Margaret Hickson, the Creswick Prize (30*l.*), for landscape; Mr. Henry Marriott Paget, prize (40*l.*), for a design for the decoration of a portion of a public building; Mr. Maurice W. Griffenhagen, first Armitage Prize (30*l.*); Mr. T. C. Sirrell Benham, first prize (50*l.*), for a set of six drawings of a figure from the life; and the following silver medallists, who stood first in various competitions:—Mr. Horace B. Fisher (two medals), Mr. John Ernest Breun (two medals), Mr. Bernard Evans Ward, Miss Theodora Joan Noyes (medal and prize), Miss Susan Ruth Canton, Mr. David John Wade (medal and first prize), and Mr. W. B. Bassett-Smith.

The Society of Engineers.—The twenty-seventh annual general meeting of the members of the Society of Engineers was held on Monday evening last, the 12th inst., in the Society's Hall, Victoria-street, Westminster. The chair was occupied by Mr. Jabez Church, vice-president. The following gentlemen were balloted for and duly elected as council and officers for the ensuing year, viz.:—As president, Mr. Jabez Church; as vice-presidents, Mr. F. E. Duckham, Mr. Arthur Rigg, and Mr. W. Schönheyder; as ordinary members of council, Mr. R. Berridge, Mr. S. Cutler, Mr. C. Gandon, Mr. C. J. Light, Mr. Perry F. Nursey, Mr. Heber Duckham, Mr. A. F. Phillips, and Mr. Arthur T. Walmisley, the three last-named gentlemen being new members of the council; as honorary secretary and treasurer, Mr. Alfred Williams; and, as auditor, Mr. W. H. Bennett.

Ashburnham House.—The following memorial, signed by Sir Henry Cole, Mr. William Morris, Mr. H. S. Milman (director of the Society of Antiquaries), Mr. J. L. Pearson, R.A. (architect at Westminster Abbey), Mr. F. C. Penrose, and others, was presented to the Governors of Westminster School by the Dean of Westminster: "On behalf of a meeting of gentlemen interested in the preservation of Ashburnham House and of the ancient remains on its site, and earnestly desirous that no encroachment should be made on the ground closely adjacent to the Abbey Church of Westminster, we venture to request that the Governing Body of Westminster School will not come to any decision adverse to the proposal about to be made by the Dean and Chapter, until they have received and heard a deputation from such meeting on the subject."

Ventilation.—Since the last meeting of the United Grand Lodge, important improvements have been made in the ventilation of the Temple, the Board-room, the De Grey, the Zetland, and the whole of the rooms in which the various lodges are held. The ventilation improvement works have been carried out by the Sanitary Engineering and Ventilation Company, of Victoria-street, Westminster, who have applied their "Imperial" ventilating-tubes and "Imperial" exhaust ventilators, under the direction of Bro. John Gibson, F.R.I.B.A. We are told that it has given general satisfaction.

Cost of Wood Paving in Chelsea.—At the last meeting of the Chelsea Vestry, the Surveyor presented a report showing that the total cost of the Fulham-road wood paving from Thistle-grove to Stamford-bridge, was as follows:—Total amount expended for labour, plant, materials, new gullies, and sundry works, 5,691*l.* 12*s.* 11*d.*; area of work executed, 10,573 yards superficial; the actual *net cost* of the wood pavement (after deducting the new gullies, and the value of the old materials carted away) amounts to 9*s.* 5*d.* per yard superficial.

Selenitic Cement.—The *Boston* (Mass.) *Journal* of November 23rd states that the American company for carrying out General Scott's well-known patent has received a gold medal at the Fourteenth Triennial Exhibition of the Massachusetts Charitable Mechanic Association at Boston.

Bagshot Church Competition.—H.R.H. the Duke of Connaught has been pleased to accept the design submitted by Messrs. Bromilow & Cheers, of Liverpool, for his church to be erected in Bagshot Park.

The Royal Academy.—At a general assembly held on the 8th inst., Mr. Peter Graham, Associate, was elected a full Academician. At the close of the President's address to the students on the 10th inst., elsewhere noticed, the students adjourned to the Antique School, and there presented the Keeper with a testimonial, in the shape of three silver salvers, and an address, which ran as follows:—"To F. R. Pickersgill, Esq., R.A., Keeper of the Royal Academy of Arts.—Sir, We, the past and present students of the Royal Academy of Arts, desire most respectfully to offer this testimonial to you, as a mark of our full appreciation of your valuable teaching, and the unvarying kindness that you have always shown to us as students of the school during the time you have so worthily held the office of Keeper. We sincerely trust that you may long remain among us, and we rest assured that both we and those that follow will alike reap the benefits of your valuable counsel and advice for many years to come."

A Norwegian Peasant, rejoicing in the sonorous name of Ola Samsonsön Midnäs, has, it is said, invented a new system of propelling vessels which dispenses with manual labour, sails, or steam power. The inventor has constructed almost without assistance a small vessel, which, according to a recently published account, was at Bergen. The general principle of the system is said to be the utilisation of the column of water which the weight of the vessel forces through an opening made to receive it, but the details have, it is stated, been kept a secret by the inventor.

Testing Traps.—We have received from Mr. Emptage a reply to Mr. Davies, but do not think it necessary to print it. We must also decline to print five other letters on the same subject; the affair has degenerated into a squabble.

TENDERS

For the erection of proposed new school at Binstead-road, Buckland, Portsmouth, for the Portsmouth School Board. Mr. A. H. Bone, architect. Quantities supplied by Mr. H. P. Foster:—

G. Longley, Worth, Sussex	£9,979 0 0
G. Burbidge, Portsmouth	9,142 0 0
Patman & Fotheringham, London	8,873 0 0
T. B. Hayter, Portsmouth	8,873 0 0
T. C. Cooper, Portsmouth	8,830 0 0
H. & W. Evans, Portsmouth	8,470 0 0
T. W. Earwaker, Portsmouth	8,400 0 0
C. Boulton & Son, Portsmouth	8,081 0 0
D. W. Lewis, Portsmouth	7,993 12 0
J. Crook, Southampton (accepted)	7,747 0 0

For three new shop-fronts, Sanford-lane, Stoke Newington, for the Incorporated Society of Licensed Victuallers. Mr. H. J. Newton, architect:—

Drew	£213 0 0
Pinegar	195 0 0
Wood	175 0 0
Cook	173 0 0
Crabtree	165 0 0
Walker	145 0 0
Pickersgill (accepted)	140 0 0

Wood Fencing.

Wood (accepted).

For making-up of Alexandra-road, for Hornsey Local Board. Mr. T. de Courcy Meade, surveyor:—

John Bell	£712 4 6
Ford & Everett	690 0 0
McDowell & Dawson	665 0 0
A. Walker	659 10 6
Dunmore	644 0 0
Strachan & Co.	640 0 0
Bloomfield	633 0 0
McKenzie, Williams, & Co., Tower-chambers, Moorgate (accepted)	598 0 0
Peill & Sons	579 0 0
Pizzey	548 0 0

For alterations and additions at Carr View, Sleights, near Whitby, for Mr. D. G. Pinkney. Mr. Edward H. Smales, architect. Quantities by Mr. H. T. Neilson, Darlington:—

Watson Bros., Darlington	£2,517 17 0
Wm. Robinson, Whitby	2,163 4 0
J. White, Whitby	2,130 19 0
J. Gladstone, Whitby	2,076 17 0
Langdale & Sons, Whitby	1,995 0 0

For the erection of new offices, bonded stores, &c., Deptford, for Mr. Alfred Kirby. Mr. Thos. Dinwiddy, architect:—

Glavin	£3,198 0 0
Jerrard	2,949 0 0
Redman (accepted)	2,875 0 0

For a pair of houses, Greenwich, for Mr. James Harvey. Mr. Thos. Dinwiddy, architect:—

Bridel (accepted)	£1,050 0 0

For additions to the South London Brewery for Messrs. R. & H. Jenner & Sons. Mr. Edwin T. Hall, architect. Quantities by Messrs. Evans & Deacon:—

H. S. Foster	£3,990 0 0
T. E. Julian & Co.	3,390 0 0
Howard & Dorrell	3,363 0 0
W. Bangs & Co.	3,329 0 0
H. Baguley	3,2 8 0 0
B. E. Nightingale	3,140 0 0
T. H. Adamson & Sons (accepted)	3,095 0 0
H. Hart	3,085 0 0

For new Board Schools, Wood-street, Woolwich. Mr. R. R. Robson, architect. Quantities by Mr. W. H. Barber:—

Peto Bros.	£14,179 0 0
Wall Bros.	13,907 0 0
Atherton & Latta	13,833 0 0
E. Lawrence	13,740 0 0
J. Grover	13,694 0 0
W. Oldrey	13,636 0 0
J. T. Chappell	13,598 0 0
F. & F. J. Wood	13,592 0 0
T. Boyce	13,479 0 0
B. E. Nightingale	13,473 0 0
C. Cox	13,363 0 0
F. Johnson	13,285 0 0
S. J. Jerrard	13,247 0 0
Stimpson & Co.	13,149 0 0
Kirk & Randall	12,845 0 0

For the enlargement of Board Schools, at Sleaford-street, Battersea. Mr. R. R. Robson, architect. Quantities by Messrs. Northcroft, Son, & Neighbour:—

T. Boyce	£7,940 0 0
J. D. Hobson	7,694 0 0
W. Downs	7,573 0 0
W. Shurmur	6,993 0 0
Atherton & Latta	6,970 0 0
J. Marsland	6,885 0 0
B. E. Nightingale	6,825 0 0
Higgs & Hill	6,784 0 0
W. Oldrey	6,633 0 0
Lathey Bros.	6,462 0 0

For new warehouses, Harrow-road, for Messrs. Lilley & Skinner. Mr. J. W. Chapman, architect. Quantities by Messrs. Goodchild & Son:—

	Time.	
Mark	6 months...	£6,410 0 0
Sawyer	6 ,, ...	6,240 0 0
Rider & Son	6 ,, ...	5,988 0 0
Higgs & Hill	6 ,, ...	5,980 0 0
W. Oldrey	4 ,, ...	5,894 0 0
Hearn	Nil. ...	5,893 0 0
Holland & Hannen	6 months...	5,743 0 0
Brass	5½ ,, ...	5,733 0 0
Woodward	3 ,, ...	5,700 0 0
Ashby Bros. (too late)	5 ,, ...	5,385 0 0

For conversion of No. 62, Atlantic-road, Brixton, into a shop. Mr. Crowys, architect:—

Macey, Brixton	£191 0 0
Hogan, Dulwich	166 0 0
Lambert, Pimlico (accepted)	123 0 0

For alterations to the Cock and Bottle public-house, Lambeth-walk. Mr. Crowys, architect:—

Burman, Kennington	£232 0 0
Beale, Westminster (accepted)	173 0 0

For construction of the London-road sewer, Southend-on-Sea, for the Local Board. Mr. Arthur Clayton, surveyor:—

Wilkes & Co., Devonshire-square, Bishopsgate (accepted).

For the erection of school buildings, &c., at the Sculcoates Union Workhouse, Hull. Mr. Samuel Musgrave, architect:—

Pearson, Hull	£13,431 1 8
Bentley & Burn, Leeds	13,200 0 0
Grassby, Hull	12,406 0 0
Sergeant, Hull	12,190 0 0
Habbershaw & Son, Hull	12,023 0 0
Wharram, Hull	11,672 0 0
Coulson, Hull	11,603 0 0
Jackson Bros., Goole	11,500 0 0
Harper, Hull	11,438 16 0
Hockney & Liggins, Hull	11,417 10 0
Brown, Hull	11,412 0 0
Jackson & Son, Hull	11,400 0 0
Stanley, Hull	11,380 0 0
Gostes, Hull	11,275 0 0
Drury, Hull	11,166 0 0
Executors of late T. Southern, Hull	11,058 0 0
Musgrave, Hull	10,997 0 0
Stamp Bros., Barton	10,518 0 0

For pair of cottages, Uphill, Somerset, for Mr. Henry Shaw:—

S. F. Harvey & Co. (accepted)	£206 0 0

For completion of house at Montpelier, Weston-super-Mare, for Messrs. Davies:—

Fear	£184 5 0
Addicott	159 5 0
S. F. Harvey & Co.	159 0 0

For Grange Bridge, Rhyl, for Mr. Joseph Evans, London and North-Western Railway Company, and the Rhyl Improvement Commissioners, jointly. Mr. B. Nelson, engineer. Quantities by the engineer:—

Contract No. 1.

Thos. Flint, West Bromwich	£1,402 11 10
Handyside & Co., Derby	1,394 3 9
Saml. Woodall, Dudley (accepted)	1,163 10 0

Contract No. 2.

Geo. Smith & Co., Southport	1,020 0 0
Bridge & Roofing Co., Darlaston	993 4 8
Saml. Woodall, Dudley (accepted)	939 10 0

Contract No. 3.

Roberts, Rhyl	4,755 0 0
Vaughan, Pontefract, Yorks	3,699 16 6
Whitley, Rhyl	3,343 18 2
Jones & Owen, Llandudno	3,516 0 0
J. B. Squires, Liverpool	3,197 10 0
Geo. Smith & Co., Southport	3,024 0 0
Braddock & Mathews,* Southport	2,994 0 0

* Accepted.

Contract No. 4.—Approaches.

Robert Jeffreys, Colwyn Bay	£3,768 11 9
Edwards, Rhyl	2,495 0 0
Geo. Smith & Co., Southport	2,469 0 0
Braddock & Mathews,* Southport	2,450 0 0

* Accepted.

For road and drainage works, Elwy Hall Estate, Rhyl, for Mr. Joseph Evans. Mr. B. Nelson, engineer. Quantities by the engineer:—

Braddock & Mathews,* Southport. . £2,800 17 8

* Accepted.

For town-hall offices, Penmaenmawr. Mr. B. Nelson, architect. Quantities by the architect:—

Collins & Son, Warrington	£2,900 0 0
Smith & Pilkington, Pier Works, Llandudno	2,459 0 0
H. Hughes, Glan Conway	2,276 0 0
Abel Roberts, Colwyn Bay	2,247 0 0
John Hughes, Llandudno	2,190 0 0
Wm. Prichard,* Llandudno	2,165 10 0

* Accepted.

TO CORRESPONDENTS.

J. H.—W. H.—R. L. T.—H. H.—S. R. J. S.—C. G. & Son.—A. B.—W. E. A.—F. M. H.—J. & W.—W. A.—P. D. T.—D. & D.—S. T. H.—W. H.—R. H. & Co.—S. M.—S. & Co.—C. & R.—J. G. R.—C. R. & Co.—J. W.—H. I. M.—J. H.—T. H.—G. & R.—A. P.—H. P. F.—R. R.—H. T. N.—J. W. C.—L. & L.—Sir R. L.—W. O.—J. W. S.—W. W. Y.—F & Co.—Another Clerk of Works.—B. & C.—J. W. H. B.—R. C.—H. L.—A. M. T.—B. & I.—S. T. H.—J. W. W.—Rev. Dr. S. (forced to decline).—H. T. (send address).—L. J. I. (not desired).—J. W. D. (clauses in the Act have been already pointed out in our pages).—T. H. (next week).—Clerk of Works Society (next week).—C. A. (next week).—A. T. W. (shall appear).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

REPLIES TO ADVERTISEMENTS,

Addressed Box ——, Office of "The Builder,"

Cannot be forwarded, but must in all cases be called for, and the Office Receipt produced.

THE CHARGE FOR A BOX IS AS UNDER:—

For "Situations Wanted" Advertisements ..... 3d. per Week.
For all other Advertisements ..... 6d. per Week

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, King-street, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catharine-street, W.C.

Advertisements for the current week's issue must reach the office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum, prepaid. Remittances payable to DOUGLAS FOURDRINIER, Publisher, 46, Catherine-street, W.C.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [Advt.

Box Ground Stone
Is the best for use in all exposed positions, being a well-known and tried weather stone.
50,000 feet cube in stock.
PICTOR & SONS,
Box, Wilts. [Advt.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset. — Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [Advt.

Doulting Stone and Ham Hill Stone, of best quality. Prices and Estimates, including delivery to any Station, on application to STAPLE & HANN, Quarrymen, Stoke-sub-Hamdon, Ilminster. Agent, Mr. E. CRICKMAY, Langbourn-chambers, 17, Fenchurch-street, E.C. [Advt.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [Advt.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tan-rooms, and terraces. [Advt.

Immense quantities of
DRY WAINSCOT,
DRY MAHOGANY,
DRY WALNUT,
in all thicknesses.
B. J. HUDSON & SONS,
Whitfield-st., W., and Great Peter-st., S.W., London. [Advt.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD,
Discount to Builders. Illustrated List two stamps. LONDON, S.E.

Roofing Felts.—F. Braby & Co.

INODOROUS, SARKING, SHEATHING, AND HAIR FELTS, KEPT ALWAYS IN STOCK. MANUFACTURERS OF PERFORATED ZINC, PERFORATED COPPER, AND PERFORATED IRON, IN VARIOUS DESIGNS AND GAUGES.

Wrought Iron Tanks.—F. Braby & Co.

PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE.

Corrugated Iron.—F. Braby & Co.

GALVANISED AND BLACK IN ALL GAUGES KEPT IN STOCK. ZINC WORK OF ALL KINDS.

FITZROY WORKS, 356 to 360, EUSTON ROAD, LONDON.

Hatton Garden, Liverpool; Great Clyde Street, Glasgow; and at Cyprus.